

## VII. Shady Pass LSR

This individual chapter focuses on the Shady Pass LSR. The first section "A", provides a more specific description of unique resources or factors associated with this LSR than was presented in the general "forest-wide" chapters. Section "B" begins the analysis portion of this document assessing relationships between this LSR and neighboring LSR/MLSA's. Section "C" continues that analysis focusing on this individual LSR.

The subheadings in "B" and "C" follow the module sequence as shown on the "LSR Analysis Flow Chart" in Chapter VII and in Appendix A. A fire plan is also included at the end of Section "C" to provide more specific detail than that in the fire management plan included in the Chapter VII. Section D includes a table summarizing all of the projects identified from the analysis of each module completed in sections "B" and "C".

It is also important to note that the type of activities derived from these modules all strive to restore or maintain late successional habitat and species, as such these modules recommend "ecologically derived" projects. The social module, on the other hand, is designed to review projects that do not incorporate these restoration or maintenance objectives. The social module is designed to provide a "road map" to use when planning begins on a specific project that is derived from some social need such as building a new hiker or motorized trail, expanding a ski area, or widening a powerline right-of-way. Since the social module is not used to identify "ecologically derived" projects, the module is not included in this or any of the other individual LSR/MLSA chapters. The Assessment Team did complete a social module for the Three Creeks ORV Trail project on the Entiat Ranger District to validate the module. This module analysis is included in Appendix X.

### A. General Description of LSR

This portion of the document describes the vegetation, wildlife, aquatic resources and human uses associated with this LSR.

#### 1. Vegetation

This section describes the current condition of vegetation groups within the Shady Pass LSR. Data was derived from a combination of aerial photo interpretation (only in the eastern-most lobe) and modeling. It should be noted that site-specific information regarding vegetation structure and distribution will need to be updated, as restoration projects are initiated. The idea would be to use the vegetation layer derived for this analysis as a starting point only.

##### a) Vegetation Group Information Unique to this LSR

###### (1) Dry Forest Group and Grassland/Shrubland

Twenty-three percent (17,579 acres) of the Shady Pass LSR consists of the dry forest group (Appendix 6 in the Forest-Wide LSR/MLSA Assessment). Within this group, 73 percent (12,860 acres) is mapped as high density and 27 percent is mapped as created openings (Appendix 5). The actual amount of created openings in this group is significantly less because of the inability of the modeling effort to distinguish between created (fire or human-caused) openings in forest environments and inherent openings (scattered forest, grassland/shrubland). For example, the area on the shore of Lake Chelan is grassland/shrubland and/or grassland/shrubland with

scattered trees and no created openings. Therefore, the amount of grassland/shrubland mapped (315 acres) is grossly underestimated. The southwestern lobe of the LSR in the vicinity of Halfway Springs and the lower portion of Silver Creek has sustained some recent logging activity, so created openings indicated in this area are correct (locations are not exact).

Within this forest group, the ponderosa pine series is limited within the LSR. In some locations, ponderosa pine exists as the sole overstory dominate, but more often is co-dominant with Douglas-fir. Shrub composition in the understory is dominated almost exclusively by *Purshia tridentata* (Chelan Basin Watershed Assessment, on file at the Chelan RD). Grasses include *Agropyron spicatum*, *Calamagrostis rubescens*, *Carex geyeri*, and *Poa wheeleri*, and forbs present include *Achillea millefolium*, *Lupinus sericeus*, *Balsamorhiza sagittata*, and *Lomatium* spp. (Chelan Basin Watershed Assessment, on file at the Chelan RD).

#### (2) Mesic Forest Sites (Embedded within the Dry Forest Group)

Mesic sites were not mapped within the Shady Pass LSR due to the limitations of the modeling process. In general, mesic sites would occur on steep (>40 percent slopes), northerly aspects, riparian areas, or moist benches within the dry forest group (see Vegetative Landscape section above). It will be important for these sites to be identified through restoration projects since suitable spotted owl habitat may need to be promoted or maintained within a 1.8-mile radius of spotted owl circles. Mesic sites outside of these circles (see wildlife section) would be managed similarly to dry forest sites, but different species compositions and structures would direct specific management strategies.

Mesic sites are typically within the Douglas-fir series and include the more moist plant associations. Ponderosa pine may be present, but only as remnants from early seral establishment. The understory tends to be more lush, often with a higher shrub component than in the more dry plant associations within the Douglas-fir and ponderosa series. Understory species include *Symphoricarpos ablus*, *Arctostaphylos uva-ursi*, *Spiraea betulifolia*, *Pachistima myrsinites*, *Shepherdia canadensis*, *Carex concinnoidea*, *Festuca occidentalis*, *Carex geyeri*, and *Calamagrostis rubescens* (Chelan Basin Watershed Assessment, on file at the Chelan RD).

#### (3) Moist Grand Fir Group

A small portion (seven percent, 5,164 acres) of the Shady Pass LSR consists of the moist grand fir group. The majority (88 percent) of this forest group is currently layered and/or mature (mid-to late-successional) (Appendix 4). The nearly 400 acres of created openings (Appendix 4) within this group are concentrated near the mouth of the North Fork of the Entiat River. Only four percent of this forest group is single layered (Appendix 4) and the mid-seral patches are small and widely scattered.

As a community dominant, grand fir becomes less important north of the Entiat River (see Vegetative Landscape section). Where grand fir does form the climax communities, it is restricted to relatively narrow bands between the dry forest group and the subalpine fir or wet forest group. One large contiguous patch of moist grand fir occurs in the southern portion of the Shady Pass LSR, otherwise it is scattered in the northern portion.

Understory composition is graminoid and forb dominated with such species as *Calamagrostis rubescens*, *Spiraea betulifolia*, *Rosa gymnocarpium*, *Linnaea borealis*, and *Chimaphila umbellata* (Wenatchee National Forest, Ecology Plot Database, and Chelan Basin Watershed Assessment, on file at the Chelan RD).

#### (4) Wet Forest Group

Twelve percent (9,279 acres) of the Shady Pass LSR consists of the wet forest group (Appendix 4). The silver fir series is the most prominent component of this group within the LSR (Wenatchee National Forest, Ecology Plot Database). The large majority (8,100 acres, 87 percent) of this group is currently mapped as layered or mature. Wet forest communities are most prevalent in the western portion of the LSR and as scattered patches between the dry forest group and the subalpine fir series on the Lake Chelan side of the LSR.

Overstory composition throughout this forest group is variable, consisting largely of silver fir. However, western hemlock, western white pine, Douglas-fir, mountain hemlock, Engelmann spruce, and lodgepole pine are also represented (Wenatchee National Forest, Ecology Plot Database). Understory composition is largely dominated by shrub species such as *Vaccinium myrtillus*, *V. membranaceum*, *Pachistima myrsinites*, and *Rhododendron albiflorum* (Wenatchee National Forest, Ecology Plot Database).

#### (5) Subalpine Fir Series

The subalpine fir series is the most abundant forest vegetation type in the Shady Pass LSR, with 26,521 acres (35 percent of LSR) (Appendix 4). This series is well distributed throughout the LSR, but is most contiguous in the southeastern lobe, in the vicinity of the north fork of Twenty-five Mile Creek. The vast majority (87 percent, 23,000 acres) of this series is mapped as layered or mature, while only eight percent (2,067 acres) is mapped as created openings and five percent (1,456 acres) as single-layered stands.

Subalpine fir is the most widespread species within the overstory (Wenatchee National Forest, Ecology Plot Database). Common seral dominants include lodgepole pine and Engelmann spruce, but western white pine, mountain hemlock, and whitebark pine may also be present, particularly in ecotones between forest types. Understory composition is typically shrub dominated and common species include *Vaccinium myrtillus*, *Vaccinium membranaceum*, *Rhododendron albiflorum*, and *Sorbus sitchensis* (Wenatchee National Forest, Ecology Plot Database).

#### (6) Whitebark Pine/Subalpine Larch Group and High Elevation Nonforest Types

The remainder of the forest vegetation within the Shady Pass LSR consists of high elevation whitebark pine and subalpine larch, with the majority being subalpine larch. Approximately 11 percent (8,365 acres) of the LSR is occupied by this forest group (Appendix 4) and 100 percent of this group consists of structures other than created openings. It should be noted that the amount and location of this forest group is underestimated. The vegetation modeling used (see Vegetative Landscape section) was not able to provide a highly accurate distinction between open forest types and rock or upland meadows. Therefore, it is likely that less rock and more of this forest group are present within the LSR. Site-specific analyses tied to restoration projects will be needed in order to rectify this discrepancy.

## 2. Late Successional Associated Wildlife Species

### a) Introduction

In this chapter, information is presented about wildlife species that are associated with the late-successional habitats, which are either present or would be managed for in the Shady Pass LSR. A total of 80 species have been identified as being associated with these kinds of forest conditions and are present, or could occur within the LSR. This species list can be found in Appendix 27.

In addition to consideration for the groups of species associated with various kinds of late-successional forests, individual species assessments were also conducted. These assessments were completed for all threatened, endangered, sensitive, candidate, management indicator, protection and buffer, and survey and manage species. Collectively, this group of species is referred to as species of special management concern. The information that is available about the status of these species within the Shady Pass LSR is summarized in this chapter. It should be noted, however, that relatively little is known about many of them.

Inventories or surveys have been conducted for only a few of the wildlife species as shown in Appendix 27. The most extensive of these were for the wood duck, northern spotted owl, mule deer and gray wolf. Inventories for the wood duck have been conducted over about 50 percent of the available habitat within the LSR. Since 1991, northern spotted owl inventories have been conducted on approximately 30 percent of the suitable habitat within the LSR.

## b) Late Successional Species By Habitat Type

### (1) Dry Forests

The dry forest vegetation group comprises about 17,579 acres (23 percent) of the Shady Pass LSR. Fire climax ponderosa pine forests historically dominated these areas and 49 wildlife species are associated with these forests.

Currently, 12,860 acres (73 percent) of the dry forest are in a successional advanced condition. Only about 617 acres are in a low density condition and could be fire climax.

Some species that are associated with the late successional or fire-climax condition of forests and that have special management status, include: tailed frog, larch mountain salamander, Harlequin duck, northern goshawk, bald eagle, Van Dyke's salamander, flammulated owl, pileated woodpecker, hairy woodpecker, white-headed woodpecker, black-backed woodpecker, Williamson's sapsucker, northern flicker, chestnut-backed chickadee, pygmy nuthatch, elk, long-legged myotis, long-eared myotis, silver-haired bat, fringed myotis, western big-eared bat, pallid bat, marten, fisher and Chelan Mtn. snail.

Historically, only a minor portion of these areas provided the structures that are associated with suitable spotted owl habitat (Thomas et al. 1990, Buchanan et al. 1995). However, fire exclusion has allowed successional advancement for suitable spotted owl habitat to develop in some areas (Agee and Edmunds 1992, Buchanan et al. 1995). These areas are now being used by spotted owls. However, the risk of large-scale disturbances causing large-scale habitat loss is of major concern (Agee and Edmunds 1992, Buchanan et al. 1995, Gaines et al. in press). One spotted owl activity center occurs in the Dry Forests. This comprises 25 percent of the total known spotted owl activity centers within the Shady Pass LSR.

### (2) Mesic Forest Sites (Embedded Within the Dry Forest Group)

The mesic forest group could not be mapped for the Shady Pass LSR because of limitations posed by having to model the vegetation. Mesic sites within the dry forests provide important wildlife habitat and add diversity across the landscape. It is suggested that these sites be identified during project level analyses and that the appropriate treatment criteria be applied.

Historically, fire occurred less frequently at these sites (refer to Chapter III), allowing for succession that resulted in a more complex forest structure such as higher canopy closure, multilayering, snags and down logs. These forests occurred in a variety of successional stages across the landscape. The late-successional conditions of these mesic forests provide habitat for

about 66 wildlife species. The high potential for future fires presents a concern about the sustainability of these forests.

Wildlife species that occur in these habitats and are of special management status include: tailed frog, Cascade frog, larch mountain salamander, Harlequin duck, northern goshawk, bald eagle, northern spotted owl, great gray owl, flammulated owl, pileated woodpecker, downy woodpecker, hairy woodpecker, white-headed woodpecker, black-backed woodpecker, three-toed woodpecker, red-breasted sapsucker, Williamson's sapsucker, northern flicker, little willow flycatcher, olive-sided flycatcher, chestnut-backed chickadee, pygmy nuthatch, mule deer, long-legged myotis, long-eared myotis, fringed myotis, Yuma myotis, western big-eared bat, silverhaired bat, pallid bat, marten, and fisher.

This forested group is capable of providing habitat structure that typically composes spotted owl nesting, roosting and foraging and dispersal habitat, while remaining within the historic range of variability.

### (3) Moist Grand Fir Group

The Moist Grand Fir group covers about 5,164 acres (seven percent) of the LSR. Historically, fire occurred less frequently than in the dry and mesic vegetation groups (refer to Chapter III), allowing successional advancement and complex habitat structure such as high crown closure, multilayering, and many snags and down logs. These conditions provide habitat for a wide array of wildlife species, including 73 species within the Shady Pass LSR.

Currently, about 4,566 acres (88 percent) of the moist grand fir group that is within this LSR is in a late-successional condition. In the absence of any major disturbance, it is expected that in 50 years 4,767 acres, and in 100 years 5164 acres of this habitat would be in a late-successional condition.

Wildlife species that are associated with the late successional conditions of this vegetation group and are of special status include the common loon, Harlequin duck, northern goshawk, bald eagle, northern spotted owl, great gray owl, flammulated owl, pileated woodpecker, downy woodpecker, hairy woodpecker, white-headed woodpecker, black-backed woodpecker, three-toed woodpecker, red-breasted sapsucker, Williamson's sapsucker, northern flicker, little willow flycatcher, olive-sided flycatcher, red-breasted nuthatch, pygmy nuthatch, tailed frog, spotted frog, Cascade frog, larch mountain salamander, warty jumping slug, blue-gray tail-dropper, papillose tail-dropper, Columbia pebblesnail, long-legged myotis, long-eared myotis, fringed myotis, Yuma myotis, silver-haired bat, western big-eared bat, pallid bat, mule deer, lynx, gray wolf, fisher, and marten.

The moist grand fir vegetation group is capable of providing structures that compose suitable spotted owl nesting, roosting, and foraging habitat while remaining within the range of historic variability. Two (50 percent) of the spotted owl activity centers located within this LSR are located within this vegetation group.

### (4) Wet Forest Group

The Wet Forest Group covers about 9,279 acres (12 percent) of the Shady Pass LSR. Historically, fire occurred relatively infrequently, (refer to Chapter III) allowing for succession to result in complex forest structures such as high crown closure, multilayering, and high numbers of snags and down logs. These conditions provide habitat for about 54 species that are associated with the late-successional conditions of these forests.

Currently about 8,100 acres of the Wet Forest Group are in a late-successional condition. In the absence of any major disturbance event, it is expected that in 50 years about 8,349 acres, and in 100 years 9,279 acres of late-successional habitat would be available.

Wildlife species that are associated with the late successional conditions of this vegetation group and are of special status include common loon, Harlequin duck, northern goshawk, bald eagle, northern spotted owl, great gray owl, peregrine falcon, pileated woodpecker, downy woodpecker, hairy woodpecker, white-headed woodpecker, black-backed woodpecker, three-toed woodpecker, red-breasted sapsucker, Williamson's sapsucker, northern flicker, little willow flycatcher, olive-sided flycatcher, red-breasted nuthatch, pygmy nuthatch, tailed frog, spotted frog, Cascade frog, larch mountain salamander, warty jumping slug, blue-gray tail-dropper, papillose tail-dropper, Columbia pebblesnail, long-legged myotis, long-eared myotis, fringed myotis, Yuma myotis, silver-haired bat, western big-eared bat, pallid bat, mule deer, elk, lynx, marten and fisher.

The Wet Forest Group is capable of providing structure that composes suitable spotted owl nesting, roosting and foraging habitat while remaining within the historic range of variability. No known spotted owl activity centers are located within this vegetation group in the Shady Pass LSR.

(5) Subalpine Fir/ Whitebark Pine/Subalpine Larch

Subalpine fir covers about 26,521 acres (35 percent) of the Shady Pass LSR and whitebark pine/subalpine larch covers about 8,365 acres (11 percent). Historically, fire frequency was relatively low but when fires did occur they were of high intensity. The longer fire-return interval (refer to Chapter III) allowed for successional advancement that resulted in complex habitat structure, such as high canopy closure, and high numbers of snags and down logs. Landscape pattern was historically highly variable with a mosaic of seral stages providing habitat for a variety of wildlife species. About 41 wildlife species within the LSR are associated with the late-successional conditions of these forests.

Currently, about 22,999 acres (87 percent) of the Subalpine Fir forests are in a late-successional condition. In the absence of any large-scale disturbances it is expected that in 50 years 24,455 acres, and in 100 years 26,522 acres would be in a late-seral condition. Currently, all of the whitebark pine/subalpine larch is in a condition other than created opening. No further detail concerning the condition of this vegetation group could be determined from available vegetation data.

Wildlife species that are associated with this series and have special status include the tailed frog, Cascades frog, larch mountain salamander, Harlequin duck, northern goshawk, bald eagle, northern spotted owl, great gray owl, pileated woodpecker, downy woodpecker, hairy woodpecker, black-backed woodpecker, three-toed woodpecker, Williamson's sapsucker, little willow flycatcher, olive-sided flycatcher, pygmy nuthatch, long-eared myotis, Yuma myotis, lynx, and marten.

Spotted owls occasionally use these forests, however, usually they only provide foraging habitat. One of the four spotted owl activity centers in the Shady Pass LSR was located in the subalpine fir forest group. It is unknown if this is actually subalpine fir or only a result of inaccurately modeled vegetation. It is possible that this spotted owl site is actually located within the wet forest group or the moist grand fir and was simply mapped incorrectly. Specific site inventories are need to validate this discrepancy.

### c) Species-Specific Information

The information presented in this section provides an overview of what is known about the species identified in Appendix Heather ? as species of special status. Information is provided on a species-by-species basis whenever it is available.

#### (1) Endangered Or Threatened Wildlife Species

There are five wildlife species and one Critical Habitat Unit, that are federally listed as Threatened or Endangered and could occur within the Shady Pass LSR. These include the bald eagle (*Haliaeetus leucocephalus*), peregrine falcon (*Falco peregrinus*), northern spotted owl (*Strix occidentalis caurina*), grizzly bear (*Ursus arctos*), gray wolf (*Canis lupus*) and Critical Habitat Unit for spotted owls.

##### (a) Bald Eagle and Peregrin Falcon

The bald eagle is known to occur within the Shady Pass LSR. About five percent of the available habitat for bald eagles has been surveyed. A portion of Bald Eagle Territory Number 3 (Safety Harbor Creek) lies within the Shady Pass LSR (Rees 1989). It is unknown if peregrine falcons occur within the LSR and only 10 percent of their habitat has been surveyed.

##### (b) Spotted Owls

Four spotted owl activity centers occur within the Shady Pass LSR. Since only 30 percent of the available habitat has been inventoried, additional sites may be present. The estimated amount of habitat within a 1.8 mile radius of these activity centers is shown in Table 56. The availability of suitable spotted owl habitat is currently at or above threshold levels at this time.

The tables below display the information for owls associated with the Shady Pass LSR.

**Table VIII-18, Spotted Owl Information in the Shady Pass LSR**

Northern Spotted Owl	Status <sup>3</sup>	Ownership <sup>4</sup>	Dry or Wet Owl <sup>5</sup>	Threshold <sup>6</sup>	Critical Habitat Unit (CHU)	Forest Interior? <sup>8</sup>	Suitable Spotted Owl Habitat	Total Dispersal Habitat <sup>9</sup>
SO 205	PY	FS	Wet	At Threshold	WA-4	Inside	3,245	196
SO502	PY	FS	Wet	Optimum	WA-5		5,444	275
SO503	P	FS	Wet	Optimum	WA-5	Inside	5,359	244
SO504	PY	FS	Dry	Optimum	WA-5	Inside	4,486	302

<sup>1</sup> Near the LSR or MLSA but not inside the LSR or MLSA.

<sup>2</sup> Spotted owl site overlaps with other LSR/MLSA.

<sup>3</sup> RS = Residential Single; P = Pair; PY = Pair with Young, based on highest occupancy.

<sup>4</sup> FS = Forest Service; PVT = Private Ownership (ownership at activity center).

<sup>5</sup> If the majority of suitable spotted owl habitat in .7 mile circle is dry or mesic, then it is a dry spotted owl. If the majority is wet, then it is a wet spotted owl.

<sup>6</sup> **Below Threshold:** < 2,663 total suitable spotted owl habitat acres in 1.8 mile circle or < 500 total suitable spotted owl habitat acres in 0.7 mile circle.

**At Threshold:** 2,663-3,994 total suitable spotted owl habitat acres in 1.8 mile circle.

**Optimum:** > 3,994 total suitable spotted owl habitat acres in 1.8 mile circle.

<sup>7</sup> The activity center is within 1/2 mile of the CHU.

<sup>8</sup> **Inside** = activity center is at least 600' inside (forest interior) late successional habitat.

**Near** = activity center is inside late successional habitat near forest interior.

<sup>9</sup> Habitat within 1.8 mile circle around activity center. Dry dispersal habitat includes vegetation codes 11, 13, and 52; mesic includes code 21; and wet includes codes 31, 35, 61, and 41.

<sup>10</sup> Dry suitable spotted owl habitat includes vegetation code 12 where size/structure is multistory greater than 9" DBH; mesic includes code 22; and wet includes codes 32, 36, 62, 64, and 42.

<sup>11</sup> A larger circle will be needed if there is less than 100 acres of suitable habitat

Restoration Opportunities: "**m**" Monitor site; "**a**" Accelerate habitat around site and home range; "**p**" Protect what nesting/roosting/foraging habitat exists.

#### (c) Critical Habitat Unit

The Shady Pass CHU's WA-4 and WA-5 overlaps 9% of the Shady Pass LSR, there are 24,405 acres of critical habitat within Shady Pass LSR. The two CHU's that make up Shady Pass were developed to support a cluster of 5 spotted owl pairs, providing essential nesting, roosting, foraging and dispersal habitat. The CHU on the Entiat side has a goal of three pairs and the CHU on the Chelan side has a goal of two pairs. Habitat in this unit is naturally patchy, and occurs primarily in stringers along the Entiat River and its tributaries, North Fork 25 Mile Creek, and tributaries to Lake Chelan. These CHU's provide essential breeding habitat connectivity between CHU's on the Wenatchee and CHU's on Okanogan National Forest. They are important range-wide for distribution of spotted owl habitat within the eastern edge of the range.

Spotted owl connectivity and sustainability was analyzed individually and collectively, see Appendix 1, "Forest Wide Spotted Owl Module" and "Individual LSR/MLSA Spotted Owl Module". The Critical Habitat Units were compared with LSRs and MLSAs, to determine if the reserves meet the intent of the CHU needs (connectivity, home range goals, juxtaposition, and range-wide distribution). The existing condition was then compared to sustainable spotted owl habitat.

It is recognized that the LSR/MLSAs were designed with the intent that habitat may be lost due to fire or other disturbances, while other LSR/MLSAs will increase in spotted owl habitat as late successional habitat is recovered. However, some LSR/MLSAs are in strategic locations for dispersal, connectivity and genetic interchange. Overtime, there is some question of sustainability of spotted owl habitat in 6 of the 27 LSR/MLSAs. The need is a long-term (>50 years) support for connectivity and home range goals for spotted owls in these LSR/MLSAs and across the province. The sustainability question is due to the amount of dry and mesic forested habitat at risk to fires in these 6 LSR/MLSAs.

The six LSR/MLSAs with sustainability questions are Swauk LSR, Shady Pass LSR, Deadhorse LSR, Boundary Butte LSR, Tumwater MLSA and Sand MLSA. In these areas, to strengthen connectivity, home ranges and spotted owl viability, parts of the CHUs may need to be maintained or adjusted. Adjusted areas should include wetter spotted owl habitat within spotted owl home ranges, which will strengthen the connectivity and species viability. Possible adjusted areas for LSR or MLSA important for spotted owl connectivity, but low in sustainability, include: Swauk LSR (wetter habitat to the north, see Forest-wide spotted owl module); Shady Pass LSR (habitat to the southeast in the Twenty-five Mile Creek CHU WA-4); Deadhorse LSR and Tumwater MLSA (all available wetter habitat is included in the LSR and CHU WA-9, monitor this reserve); Boundary Butte LSR (wetter habitat to the south, including spotted owls inside the CHU WA-11); and Sand MLSA (wetter habitat to the south, including spotted owls inside the CHU WA-12).



In all LSR/MLSAs, except the Swauk LSR, Shady Pass LSR, Deadhorse LSR, Boundary Butte LSR, Tumwater MLSA and Sand MLSA, these reserves are predicted to provide the needs for spotted owl recovery over time (50+ years). The Chiwawa LSR and the Manastash LSR are predicted to be sustainable from fire over time. The LSR/MLSA reserve network will also provide the function the CHUs were designated for. Coupled with the LSR/MLSA management, riparian reserve function, Wilderness areas, and Unmapped LSRs, the needs of the spotted owl will be met. These reserves function for connectivity and spotted owl home ranges. It is concluded that the LSR/MLSAs meet the function of the CHU system, as intended in the NWFP (NWFP C-9). Monitoring and maintaining connections, as well as meeting LSR goals will be ongoing.

(d) Grizzly Bear and Gray Wolf

No class 1 grizzly bear observations have been made within the Shady Pass LSR, however, class 1 observations have been reported nearby (Almack et al. 1993). Grizzly bears are suspected to occur within the LSR and about 10 percent of their available habitat has been surveyed. Gray wolves are known to occur within the LSR and about 20 percent of their habitat has been surveyed. In addition, confirmed wolf locations have been made to the south and north of this area (Gaines et al. 1995).

(e) Marbled Murrelet

There is no marbled murrelet marine foraging habitat within the Shady Pass LSR.

(2) Sensitive And Candidate Wildlife Species

There are 16 wildlife species on the Region VI Sensitive Species list or are federal candidate species that could occur within the Shady Pass LSR. These include the Harlequin duck (*Histrionicus histrionicus*), goshawk (*Accipiter gentilis*), willow flycatcher (*Empidonax trailii*), olive-sided flycatcher (*Contopus borealis*), tailed frog (*Ascaphus trueii*), spotted frog (*Rana pretiosa*), Cascade frog (*Rana cascadae*), Columbia pebblesnail (*Fluminicola columbiana*), long-legged myotis (*Myotis volans*), long-eared myotis (*Myotis evotis*), fringed myotis (*Myotis thysanoides*), Yuma myotis (*Myotis yumanensis*), Western big-eared bat (*Plecotus townsendii*), lynx (*Lynx canadensis*), fisher (*Martes pennanti*), and wolverine (*Gulo gulo*).

(a) Birds

The Harlequin duck is known to occur within the Shady Pass LSR and formal surveys have not been conducted. The goshawk is known to occur and surveys have been completed over about 10 percent of the available habitat. The little willow flycatcher and olive-sided flycatcher are suspected to occur and no surveys have been completed.

(b) Amphibians

No formal surveys for amphibians have been completed within the Shady Pass LSR. The tailed frog is known to occur and the presence of the spotted frog and Cascade's frog is unknown.

(c) Mollusks

No surveys for the Columbia pebblesnail have been conducted and its presence is unknown.

(d) Mammals

Surveys for the western big-eared bat have been completed over about 5 percent of the available habitat within the LSR. Surveys for other bat species have not been completed. It is unknown if the long-legged myotis, long-eared myotis, fringed myotis, Yuma myotis or the western big-eared bat occur in the Shady Pass LSR.

Surveys for lynx and fisher have been conducted over about 10 percent of the available habitat, and surveys for wolverine have been completed on about five percent of the available habitat. Lynx and wolverine are known to occur and fisher are suspected.

d) Management Indicator Species (MIS)

There are 13 wildlife species that are listed as management indicator species that occur or could occur within the Shady Pass LSR. These species include the pileated woodpecker (*Dryocopus pileatus*), downy woodpecker (*Picoides pubescens*), hairy woodpecker (*Picoides villosus*), three-toed woodpecker (*Picoides tridactylus*), red-breasted sapsucker (*Sphyrapicus ruber*), Williamson's sapsucker (*Sphyrapicus thyroideus*), northern flicker (*Colaptes auratus*), ruffed grouse (*Bonasa umbellus*), mule deer (*Odocoileus hemionus*), elk (*Cervus elephus*), mountain goat (*Oreamnos americanus*), beaver (*Castor canadensis*), and marten (*Martes americana*).

(a) Primary Cavity Excavators

No formal surveys for primary cavity excavators have been completed. The pileated woodpecker, hairy woodpecker and northern flicker are known to occur within the LSR and the remaining MIS primary cavity excavators are suspected to occur.

(b) Ruffed Grouse and Beaver

No surveys for the ruffed grouse have been conducted and only five percent of the available habitat has been surveyed for beavers. Ruffed grouse are suspected to occur and beaver are known to occur.

(c) Mule Deer, Elk, Mountain Goat

Surveys for mule deer and mountain goats have covered about 10 percent of the available habitat. No surveys for elk have been completed. All three species are known to occur within the LSR.

(d) Marten

Marten are known to occur in the LSR and about 10 percent of their available habitat has been surveyed.

e) Survey And Manage, Protection And Buffer Species

There are eight species that are known or suspected to occur within the Shady Pass LSR and are identified as survey and manage, or protection and buffer species. These include the great gray owl (*Strix nebulosa*), flammulated owl (*Otis flammeolus*), white-headed woodpecker (*Picoides albolarvatus*), black-backed woodpecker (*Picoides arcticus*), pygmy nuthatch (*Sitta pygmaea*), warty jumping slug (*Hemphillia glandulosa*), blue-gray tail-dropper (*Prophyaon coeruleum*), and papillose tail-dropper (*Prophyaon dubium*).

(1) Birds

The great gray owl is suspected to occur within the Shady Pass LSR although no surveys have been completed. No surveys have been completed for the flammulated owl, white-headed woodpecker, black-backed woodpecker, or pygmy nuthatch. The pygmy nuthatch and flammulated owl are suspected to occur and the white-headed woodpecker and black-backed woodpecker are known to occur in the Shady Pass LSR.

(2) Mollusks

The *oreohelix n. sp.*, Chelan Mountain snail is a survey and manage species known to exist in the Chelan and Entiat drainage. It is unknown if the warty jumping slug, blue-gray tail-dropper, or papillose tail-dropper occur in the LSR and no surveys have been completed.

## (3) Amphibians

No surveys of the larch mountain salamander or the Van Dyke's salamander have been conducted within the LSR and it is unknown if they occur here.

## f) Habitat Effectiveness

A variety of human activities have and do occur within the Shady Pass LSR. These include timber harvest, roading, fire exclusion, recreational uses, activities on private lands, and fires. These activities have the potential to affect late-successional associated species, especially those that are known to be sensitive to human disturbance.

The open road density within the LSR is 0.9 miles/square mile and the area within security habitat is 69 percent. The overall habitat effectiveness based upon the open road density is currently high and the level of security habitat is considered to be at a moderate level. The distribution of roads and security habitat across vegetation types shows that the dry, mesic and wet vegetation groups currently have low habitat effectiveness and low levels of security habitat. The subalpine fir has moderate to high habitat effectiveness and moderate security habitat. The whitebark pine and subalpine larch have high habitat effectiveness and high security habitat.

## g) Connectivity

Connectivity between late-successional habitat patches is important to providing movement between patches, minimizing local extinctions, and reducing genetic isolation (Harris 1984, Noss and Harris 1986). In order to assess connectivity between the Shady Pass and adjacent LSR/MLSA's the dispersion index was used (as described in Appendix 1 of the Forest-Wide LSR/MLSA Assessment). A total of four potential linkages was evaluated; Shady Pass to Sawtooth, Shady Pass to Lucerne, Shady Pass to Slide Ridge, and Shady Pass to Chiwawa. The overall dispersion index for this LSR was 2.2. Two linkages (Chiwawa to Shady Pass and Lucerne to Shady Pass) were indexed as 3, allowing for dispersal of low, moderate and high mobility species on two of the four linkages (Shady Pass to Slide) as indexed as 2, allowing for dispersal of high and moderate mobility species. One linkage (Shady Pass to Sawtooth) was indexed as 1, allowing for dispersal of high mobility species only.

**Table VIII-19, Dispersion Indices for Shady Pass.**

Linkage	Distance (km)	High	Mod	Low	Index	Barrier
SP-Sawtooth	2.5	yes	no	no	1	Lake
SP-Lucerne	1.3	yes	yes	yes	3	
SP-Slide Ridge	2.2	yes	yes	no	2	Fire
SP-Chiwawa	1.6	yes	yes	yes	3	Ridge
<b>Overall</b>					<b>2.2</b>	

## 3. Aquatic

The aquatic resource analysis for Shady Pass LSR considered the LSR's conditions using 20 categories to evaluate the aquatic situation. Generally, the aquatic condition in Shady Pass LSR

is similar to the forest wide aquatic condition. Specific conditions and sites could be improved through future management activities.

Shady Pass LSR contains portions of 10 Fish Production Units (subwatershed's). These subwatershed's are Bear, SW Shore Chelan, Corral-Big, S. Shore Chelan, Twenty-five Mile, Lake-Silver-Pope, National Forest Entiat, Lower Entiat, Upper-Mid Entiat, Three-Tommy. The average annual precipitation on the lands within Shady Pass LSR vary between 30 and 70 inches. Of the 76,502 acres within the LSR, an estimated 6,832 acres are within Riparian Reserves, or approximately 9% of the area. The Entiat river is a Key Watershed.

#### 4. Human Uses

##### a) Overview

The Shady Pass LSR is located on the Entiat and Chelan Ranger Districts. The portion adjacent to Lake Chelan is very inaccessible, access is limited to the few recreation developments along the shore where the terrain is flat enough to allow campsites and a boat dock.

##### b) Prehistoric and Historic Summary

A large part of this LSR has not been surveyed for prehistoric sites. Based upon surveys of nearby areas there is little evidence of prehistoric use in this LSR. Some use may have occurred upon the shores of Lake Chelan but many of these sites would now be underwater since the lake level was raised earlier in this century for power production and irrigation purposes.

Around the 1900's the higher, open ridgetops were heavily grazed by sheep bands. This use continued on into the 1930's.

The Shady Pass Road was one of the earliest roads constructed in the 1930's by the Civilian Conservation Corps.

Some logging began prior to the 1950's in the Tyee and Mud Creek areas that was easy to access. Larger scale logging did not begin until after the 1950's associated with construction of forest roads.

##### c) Recreation

##### (1) Facilities

##### (a) Campgrounds

There are six campgrounds on the Chelan District portion of the LSR and eight campgrounds on the Entiat District portion. The table below displays information about these.

**Table VIII-20, Campground Facilities and Use, Shady Pass**

Campground	No. of Units	District	Accessed by:	Use Season	Use Levels <sup>1</sup>
Big Creek	4	Chelan	Boat	Memorial Day to Labor Day	High

<sup>1</sup> Use levels have not been accurately or consistently recorded. The level of use indicated here reflects: Heavy = facility typically filled to capacity on weekends, weekday use may run at 30% or higher; Moderate = filled to capacity on weekends, weekday use less than 30%; Low = Not filled to capacity on weekends, weekday use less than 10%.

Campground	No. of Units	District	Accessed by:	Use Season	Use Levels <sup>1</sup>
Corral Creek	4	Chelan	Boat	Memorial Day to Labor Day	High
Cottonwood	25	Entiat	Road	May 15 <sup>th</sup> to Oct. 31 <sup>st</sup>	Moderate
Graham Harbor	5	Chelan	Boat	Memorial Day to Labor Day	High
Halfway Spring	?	Entiat	Road	May 15 <sup>th</sup> to Oct. 31 <sup>st</sup>	Moderate
Handy Spring	1	Chelan	Road	June to Nov. 1 <sup>st</sup>	Low
Junior Point	5	Chelan	Road	June to Nov. 1 <sup>st</sup>	Low
North Fork	8	Entiat	Road	May 15 <sup>th</sup> to Oct. 31 <sup>st</sup>	Moderate
Silver Falls	31	Entiat	Road	May 15 <sup>th</sup> to Oct. 31 <sup>st</sup>	Moderate
Spruce Grove	2	Entiat	Road	May 15 <sup>th</sup> to Oct. 31 <sup>st</sup>	Moderate
Three Creeks	3	Entiat	Road	May 15 <sup>th</sup> to Oct. 31 <sup>st</sup>	Moderate

Ramona Park campground is located just outside this LSR. This is a moderately- to heavily-used campground serving as an overflow from the state park use.

(b) Trails

Trails are an important recreation facility for both Districts. Most of the trail mileage outside of wilderness is open to motorized users. The motorized trail system in the LSR is part of a larger motorized trail system that extends across the Lake Wenatchee, Entiat and Chelan Ranger Districts. This motorized trail system is popular with motorcyclists throughout Washington state.

The trail system also includes a National Recreation Trail and interpretive trail associated with the trail development at Silver Falls.

(c) Overview of Other Recreation Uses

(i) Recreation Residences

There are two recreation residences at Twin Harbor and two tracts on the Entiat, which combine for a total of 17 residences. These are privately-owned recreational cabins that are located on National Forest lands by special use permit.

(ii) Snowmobiling

Sno-parks are located just beyond the private land on the Entiat River Road and at 25 Mile Creek. A groomed trail is maintained from this snow park over Shady Pass and to 25 Mile Creek. Periodically, the road to Big Hill will be groomed to a scenic saddle which is located approximately halfway to Big Hill. The snowmobiling season runs from December through March. This snowmobile route is fairly popular. Some snowmobiling occurs up the Entiat River Road, however this use is fairly low.

#### d) Social and Economic Considerations

This LSR has several important social values. The scenic value as viewed from Lake Chelan is particularly high, enhancing the experience for lake users. The motorized trail system provides an important recreation experience for residents throughout Washington. The Entiat drainage and, to some extent other areas within the LSR, has also produced many wood products over recent decades contributing employment and economic benefits to the community.

Whidbey Naval Air Station conducts approximately 6 flights per day year around over this area with various jet aircraft. These flights take place between 200 and 1500 feet above ground level during daylight hours.

### B. Analysis Between LSR/MLSA's

#### 1. Sustainability

##### a) Sustainability Analysis

The sustainability of LSR's/MLSA's across the Forest is displayed in Table 19. The Shady Pass LSR falls in the middle one-third of all LSR's/MLSA's in terms of the amount of at-risk vegetation and the degree to which its current vegetative conditions are sustainable into the future. An important consideration in terms of sustainability is the relationship of the Shady Pass LSR to neighboring LSR's. Four LSR's (Sawtooth, Lucerne, Slide Peak and Chiwawa) are, for the purposes of this analysis, considered to be neighbors. In terms of overall sustainability, Shady Pass ranks lower than Sawtooth, Slide Peak (which burned in its entirety in 1994) and Chiwawa, (22 percent of which burned in 1994), and higher than Lucerne. The following table shows the acres at risk and the ignition risk determined in the Forest-wide sustainability analysis for Shady Pass and its four neighboring LSR's.

Table VIII-21, Acres at Risk and Ignition Risk, Shady Pass LSR.

LSR/MLSA	% of LSR/MLSA at Risk		% of LS Forest at Risk		Ignition Risk
	Acres	Pct.	Acres	Pct.	
Shady Pass	31,142ac	41%	31,044ac	69%	Moderate
Sawtooth	2,334ac	15%	2,331ac	97%	Moderate
Lucerne	4,985ac	58%	4,955ac	95%	High
Chiwawa	29,042ac	27%	21,345ac	38%	Moderate
Slide Peak	341ac	21%	341ac	100%	High

When looking at sustainability issues between LSR's/MLSA's, the factor driving this analysis is the amount and location of at-risk vegetation between the Shady Pass LSR and its four neighbors. In other words, identifying linkages in at-risk vegetation that would facilitate the spread of fire from one LSR/MLSA to another. A review of at-risk vegetation maps reveals that this linkage does not exist between the Shady Pass and Sawtooth LSR's, due to the presence of Lake Chelan, which lies directly between the two.

On the other hand, Lucerne LSR lies only one mile northwest of Shady Pass, and the area between the two is comprised mostly of at-risk vegetation. This makes the spread of fire from one to the other very likely; moreover, due to Shady Pass LSR's position directly downwind from Lucerne, the spread of fire from Lucerne to Shady Pass is more likely than the reverse. There is also considerable at-risk vegetation between Shady Pass and Slide Peak. However, because Slide Peak burned in 1994, the threat of burning one LSR because of fire in another is a moot point in the short term. The 1994 Tyee Fire also burned most of the at-risk vegetation linking Shady Pass and Chiwawa LSR's, thereby greatly reducing the threat of fire spreading from one to the other in the near future.

#### (1) Implications

Although the analysis presented would indicate that the area lying between Lucerne and Shady Pass would be a high priority for fuel reduction efforts, this area lies within the Glacier Peak Wilderness. The wilderness designation limits fuel management options to only those consistent with wilderness management objectives, such as the use of prescribed natural fire. The need to do anything between Shady Pass and either Chiwawa or Slide Peak has been greatly lessened by the 1994 Tyee Fire, which burned ten's of thousands of acres between and within these LSR's. In other words, the opportunity to do something to improve the sustainability of the late-successional vegetation that existed two years ago within the Chiwawa and Slide Peak LSR's has been lost.

## 2. Northern Spotted Owl

The Shady Pass LSR is not one of the "big three" LSR's on the forest designated as a large population cluster/source center LSRs, for the recovery of the spotted owl. Shady Pass LSR is part of the smaller "local population" centers, which are linked to the metapopulations through dispersing individuals. The spotted owl is a Threatened species, with the recovery dependant on the implementation of the NWFP, especially in LSR/MLSAs (FSEIS Appendix G, Biological Opinion, 1994).

For final recovery of the northern spotted owl, smaller LSRs/MLSAs contribute to the goal of occupied home ranges (See table below). The Shady Pass LSR has a goal of 5 pairs of spotted owls.

**Table VIII-22, Connectivity Between LSRs: Spotted Owl Pair Goals for LSRs and MLSAs, and CHUs.**

LSR or MLSA Status and Connectivity	S.Owl Pairs --1994, FSEIS Appendix G, Table G-3	Highest Occupancy and Reproductive Status, for Field Seasons 1995 ---- 1996		Number of Owl Pairs CHU Should Support, as per USFWS - CHU discussion.	
Twisp/War Cr LSR - 141, Okanogan N.F.	1 Pr	?	?	1 Pr	WA-1
Black Cny LSR140, Oka. NF	0 Prs	0	0	--	NA
Sawtooth LSR RW 139, 78% Oka. NF	1 Pr - Oka NF	?	?	--	NA

LSR or MLSA Status and Connectivity	S.Owl Pairs --1994, FSEIS Appendix G, Table G-3	Highest Occupancy and Reproductive Status, for Field Seasons 1995 ---- 1996		Number of Owl Pairs CHU Should Support, as per USFWS - CHU discussion.	
Sawtooth RW 139, 22% Wen. NF	0 - WNF	0	0	--	NA
Slide Peak RW 137	0	0	0	--	NA
Lucerne RW138	0	1 RS <sup>1</sup>	1 site <sup>1</sup>	--	NA
<b>Shady Pass RW136</b>	<b>4 Pairs</b>	<b>4 Pairs</b>	<b>5 sites + 1<sup>1</sup></b>	<b>5 Pairs</b>	<b>WA-5 (3pr)  WA-4 (2pr)</b>
Chiwawa RW 135	11 Pairs + 1 Res Single	16 Pairs + 3 Res Singles	18 + 1 <sup>1</sup> (7 Sites*)	21+ Pairs	WA-6
Twin Lakes DM1	--	1 Pr	1 Pr	--	NA
Deadhorse RW133	4 Pr	7 Pr + 2 RS	7 sites + 1 <sup>1</sup> (2 Sites*)	4+ Pr	WA-9
Eagle DM5	--	1 Pr	1 site	--	NA

<sup>1</sup> Spotted owl activity center within 1/4 mile of LSR/MLSA boundary.

\* S.owl activity center may have been lost, due to 1994 Chelan Forest Fires, monitoring still underway.

<sup>2</sup> Spotted owl activity center on Private Land.

Objectives in the Shady Pass LSR should protect and enhance conditions of late successional and old growth forest ecosystems, while serving as habitat for late successional forest related species, including the northern spotted owl (NWFP A-4, 1994). Shady Pass LSR is important for maintaining well distributed and well-connected spotted owl populations. The four nearest LSR/MLSA's were evaluated to determine their potential for dispersal to occur. This analysis showed that spotted owls could likely disperse to the Chiwawa LSR, and Lucerne LSR. There may be some difficulty crossing Lake Chelan, for dispersing owls into the Sawtooth LSR and the Okanogan portion of the North Cascades Province. Slide Peak LSR could have dispersal, however, the LSR is small with the least amount of suitable spotted owl habitat on the.

Habitat providing dispersal/connectivity corridors between LSR's (outside LSR/MLSA's) include: Glacier Peak Wilderness for the northwestern portion of the Shady Pass LSR; Cougar



Creek, Tommy Creek, 3 Creeks, Pomas Creek, Lake Creek; and 25 Mile Creek to Slide Peak. (see Forest Interior map). These connectivity corridors should be monitored for effectiveness, and should overlap into Riparian Reserves, unmapped LSR's, wilderness, etc.

### 3. Connectivity (Plant & Wildlife)

#### a) Plant Connectivity

Connectivity can be addressed at several spatial scales when assessing an individual LSR. Connectivity of the LSR/MLSA network on the Wenatchee National Forest has been addressed above in the section entitled "Species with Special Status." Vascular plant connectivity, specific to the Shady Pass LSR, is analyzed in this discussion. Refer to Forest-wide Assessment discussions for connectivity descriptions of lichens, bryophytes and fungi.

First, connectivity relative to the Shady Pass LSR can be viewed from how well-connected the habitat is to surrounding LSR's or MLSA's. Primarily, connectivity by vegetation group within the Sawtooth LSR only exists for species with high dispersal capabilities; the cause of this being Lake Chelan. Relative to the Lucerne LSR, connectivity exists for dispersal classes of the dry forest group. However, no connectivity exists for any dispersal class of the moist grand fir and whitebark pine/subalpine larch vegetation groups. This is a consequence of the absence or limited occurrence of these vegetation groups in the Lucerne LSR. In the wet forest group and subalpine fir series, connectivity for the moderate and high dispersal classes is dependent on habitat between the Shady Pass and Lucerne LSR's.

Due to the lack of connectedness in the wet vegetation group and subalpine fir series, there is no connectivity for low dispersal species between these two LSR's. Relative to the Slide Peak LSR, connectivity in the dry/mesic vegetation group only exists for species with high dispersal capability. In the low and moderate dispersal classes for the dry/mesic vegetation group and all dispersal classes for the subalpine vegetation group, connectivity is dependent on the occurrence of habitat outside or between LSR's. No connectivity exists for the moist grand fir, wet, and whitebark pine/subalpine larch vegetation groups, as these groups are not present in the Slide Peak LSR.

Table VIII-23, Shady Pass -- Vascular Plant Connectivity

LSR/MLSA	Vegetation Group								
	Dry/Mesic			Moist GF			Subalpine		
Dispersal Class	1	2	3	1	2	3	1	2	3
Sawtooth	N	D	Y	A	A	A	N	D	Y
Lucerne	Y	Y	Y	A	A	A	N	D	D
Slide Peak	D	D	Y	A	A	A	D	D	D
Chiwawa	Y	Y	Y	N	N	Y	D	Y	Y

Dispersal Codes = Y=Yes (Connectivity); N=No (Not Connected); A=Veg Group Absent; D=Dependent (Connectivity Depends on Outside Habitat)

b) **Wildlife Connectivity**

Connectivity between late-successional habitat patches is important to provide movement between patches, minimize local extinctions, and reduce genetic isolation (Harris 1984, Noss and Harris 1986). In order to assess connectivity between the Shady Pass and adjacent LSR/MLSA's the dispersion index was used (as described in Appendix 1 of the Forest-Wide LSR/MLSA Assessment). A total of four potential linkages were evaluated: Shady Pass to Sawtooth, Shady Pass to Lucerne, Shady Pass to Slide Ridge, and Shady Pass to Chiwawa. The overall dispersion index for this LSR was 2.0. One linkage (Lucerne to Shady Pass) was indexed as a 3 allowing for dispersal of low, moderate and high mobility species. Two of the four linkages (Shady Pass to Slide Ridge and Shady Pass to Chiwawa) were indexed as 2 allowing for dispersal of high and moderate mobility species. One linkage (Shady Pass to Sawtooth) was indexed as 1 allowing for dispersal of high mobility species only.

**C. Analysis Within the LSR**

**1. Unique Habitats And Species**

a) **Landscape Analysis**

The western portion of the Shady Pass LSR is within a bioregion center of species rarity and endemism for plants. It is adjacent to Lake Cr. Potential Botanical Area.

b) **Micro-site Analysis**

(See Table 26 Forest-Wide Unique Habitats and Species)

c) **Riparian Reserves**

The Shady Pass LSR has at least 9% in Riparian Reserves. There are wetlands and open water inclusive in this LSR. Wet lands are composed of wet meadows, seeps, lake edges and streambanks.

d) **Non-Forested Vegetation**

Shady Pass LSR has the highest amount of cliffs, talus, rock, scree of any LSR or MLSA on the Forest. There are 5,345 acres, which is 7% of this LSR. Other non-forested vegetation includes: shrub fields (2%), which is one of the highest amounts of LSR/MLSA; subalpine meadows (3%) which is a high amount; and natural openings. Very little deciduous forests exist in this LSR.

e) **Survey & Manage And Protection & Buffer**

There are 3 of these species known to exist within this LSR, including lynx, black-backed woodpecker, and white-headed woodpecker. Other survey & manage or protection and buffer species are suspected to occur here, such as great gray owl, flammulated owl, the bats, Larch Mt. Salamander, lichens, and fungi.

f) **Unique Forests**

The Shady Pass LSR has the highest amount (11% 8,363 acres) of whitebark pine on the Forest. Shady Pass also has the highest amount of Forest Interior habitat on the Forest (25% in Moist and High Elevation 18,936 acres). Other unique forests include dry old growth ponderosa pine, disjunct western red cedar, past Champion Subalpine Larch (Big Hill), Pacific yew patches. The snag quality for Shady Pass is rated as Moderate (see Snag Analysis Below).

## g) Other Unique Species And Sites

## (1) Proposed, Endangered, Threatened, Sensitive (PETS) Species

The Shady Pass LSR has 8 PETS wildlife, 1 PETS fish, and 2 Sensitive plants. The wildlife include wolverine, gray wolf, goshawk, bald eagle, harlequin duck, tailed frog, lynx and spotted owl. PETS fish include bull trout. Sensitive plants include *Illiamna longesepela* and *Carex bauxbaumii*. To determine if there is immediate viability concerns for these species, see "Species with Special Status Module".

## (2) Management Indicator Species

The Shady Pass LSR has 9 management indicator species, they are mountain goat, mule deer, elk, pileated woodpecker, marten, ruffed grouse, beaver, bald eagle and spotted owl. See Wenatchee National Forest Land and Resource Management Plan for further information on management direction for these species.

## (3) Traditional Use Sites

American Indian usage of this LSR is known for rock paintings, possible vision quest sites, and food storage sites in the talus and ridge tops. Food gathering of huckleberries, root crops, and mule deer has also occurred. These sites need to be protected and continued traditional access provided.

Areas providing high quality biodiversity abundance, connectivity and functioning for unique habitats and species are the following:

- Chelan/Entiat Divide
- Duncan Hill/Fern Lake
- Entiat River Valley
- North Fork Entiat to South Fork Pyramid Creek
- Silver Falls-to Cotton wood
- North Fork 25 mile Cr. to Junior Point

## h) Shady Pass Treatment Potential:

- Reduce noxious weed spread in meadows and natural openings;
- Reduce roads in forest interior patches;
- Reduce encroaching trees in subalpine meadows;
- Conduct prescribed fire in low density dry forest, (vegetation type 11);
- Conduct prescribed habitat burns in Whitebark pine;
- Protect riparian from grazing;
- Remove roads/trails from talus and Riparian Reserves;
- Balance lynx prey/travel/denning habitat;
- Protect large trees and screen near talus, cliffs, caves, meadows;
- Maintain black-backed woodpecker nesting/roosting/foraging habitat;

- Create log den sites in low quality roaded/forest for marten, fisher, and lynx;
- Meet high end snag levels;
- Protect/maintain/enhance/monitor PETS;
- Thin to accelerate old growth
- Retain access for American Indian traditional use sites

Table VIII-24, Snag/Log/Green Tree Recruitment Analysis for Shady Pass LSR

HIGH QUALITY	MEDIUM QUALITY	LOW QUALITY
Moist & Wet Veg Groups	Subalpine Fir & Mesic Veg	Dry & Whitebark Veg
7% Moist, 12% Wet	** 35% SAF	23% Dry
>60% LS (non-dry) Habitat	15% - 60% LS Habitat	<15% LS Habitat, ** 49% LS
80% - 100% LS (all) Habitat	40% - 80% LS/M Habitat	<40% LS/M Habitat, ** 66% all LS
> 30% Forest Interior (non-dry)	15% -29% Forest Interior Non-dry	<15% Forest Interior ND, ** 25% F.I. wetter
>10% Forest Interior Dry	5% - 9% Forest Interior Dry	< 5% Forest Interior Dry, ** 5% F.I. dry
>16% in Riparian Reserves	10% to 16% in Riparian Reserves	<10% in Rip Res, ** 9% Rip Reserves
0 Mi/Sq Mi Any Rds in Rip Res	0 to 1 Mi/Sq Mi Rds in Rip Res	> 1 Mi/Sq Mi Rd Rip Res, ** 2.28 Mi/Sq Mi in Rip
< 1 Mi/Sq Mi Open Roads	1 Mi to 2.5 Mi/Sq Mi Roads	> 2.5 Mi/Sq Mi Roads, ** 0.87 Mi/Sq Mi
>70% Security Habitat, ** 68% Security Hab	50% to 70% Security Habitat	<50% Security Habitat
>10% in Past Burns, **> 10% burned	--	<10% in Past Burns
>50% Insect/Pathogens, ** (see Insect/Disease Write Up)	25% - 50% Insect/Pathogens	< 25% Insect/Pathogens
<10% Past CC Harvest, ** <10% in Clear Cuts	11% - 25% Past CC Harvest	>25% Past CC Harvest
<10% Past PC Harvest, ** < 10% in Partial Cut	11% - 50% Past PC Harvest	>50% Past PC Harvest

## i) Potential Treatments:

- Reduce roads in riparian reserves;

- Reduce Roads in Forest Interior Patches;
- Retain Snags at High End of Range;
- Improve contiguous forest conditions.

#### j) Species with Special Status (Plant)

There is one species with special status suspected to occur within the Shady Pass LSR, *Carex buxbaumii*. This species appears on the Regional Forester's Sensitive Species List and is listed as sensitive by the Washington State Department of Natural Resources. *Carex buxbaumii* is known from a nearby location in Lake Creek Basin. There is potential habitat for a number of other species with special status, but few surveys have been carried out to determine presence or absence. Plant surveys should be carried out in conjunction with restoration projects, as well as surveys independent of other activities. It is important that species ranges are known so that better estimates of species viability can be assessed. In addition, little is known about most species habitat and biological requirements, and inventories provide a first and necessary step in obtaining this information.

Few, if any, studies have addressed biological and ecological aspects of *C. buxbaumii*. *Carex buxbaumii* is found in sunny bogs, marshes, and lake margins in calcareous regions (Mckenzie 1935, Hitchcock et al. 1969, Smith-Kuebel and Lillybridge 1993). Hitchcock et al. (1993) note that this species apparently requires ample moisture, but even where these conditions are met its occurrence is irregular. The species reaches its western limit in Washington, likely contributing to its rarity in this area (Mckenzie 1935).

#### k) Survey and Manage Species (Plant)

There are no known survey and manage plant species within the Shady Pass LSR (See Appendix 6 & 7). Although a few species are suspected, even more are simply unknown. The ROD provides standards and guidelines for survey and manage species.

Refer to Appendix 6 for a complete listing of Sensitive and Survey and Manage Species Forest-wide.

Table VIII-25, Sensitive and Survey and Manage Species in Shady Pass LSR

Latin name	Common name	Federal *	State +	Forest Servic e ++	Presence **
<i>Agoseris elata</i>	Tall Agoseris		S		S
<i>Allotropa virgata</i>	Sugarstick			SM	S
<i>Anemone nuttalliana</i>	Pasqueflower		S		S
<i>Astragalus arrectus</i>	Palouse Milk-Vetch		S		S
<i>Botrychium minganense</i>	Victorin's Grape-Fern		S	SM	S
<i>Botrychium montanum</i>	Mountain Moonwort		S	SM	S
<i>Botrychium simplex</i>	Little Grape-Fern		S		S
<i>Carex buxbaumii</i>	Buxbaum's Sedge		S		K

Latin name	Common name	Federal *	State +	Forest Service ++	Presence **
<i>Chaenactis thompsonii</i>	Thompson's Chaenactis		S		S
<i>Cryptogramma stelleri</i>	Steller's Rockbrake		S		S
<i>Cypripedium fasciculatum</i>	Clustered Ladyslipper	SP	T	SM	S
<i>Cypripedium montanum</i>	Mountain Ladyslipper			SM	S
<i>Epipactis gigantea</i>	Giant Hellebore		S		S
<i>Githopsis specularioides</i>	Common Blue-Cup		S		S
<i>Hackelia hispida</i>					S
<i>Hackelia venusta</i>					S
<i>Iliamna longisepala</i>	Longsepal Globemallow		S		K
<i>Orobanche pinorum</i>	Pine Broomrape		S		K
<i>Pellaea brachyptera</i>	Sierra Cliff-Brake		S		S
<i>Spiranthes porrifolia</i>	Western Ladies-Tresses		S		S

Key to Columns: "\*" Federal status - "SP" = Special Protection; "+" Washington state status - "S" = Sensitive, "T" = Threatened, "E" = Endangered; "++" Forest Service designations - "SM" = Survey and Manage; "\*\*" Present (or absent in LSR/MLSA) - "K" = Known, "S" = Suspected

## 2. Connectivity (Plant and Wildlife)

### a) Plant Connectivity

Connectivity can also be addressed by analyzing the connectedness of habitats within the LSR. Within the Shady Pass LSR, most forest groups are fairly well connected. Many disjunct populations result from inherent breaks or openings in the landscape. At this time, information is not available to complete this type of analysis for the Shady Pass LSR.

### b) Wildlife Connectivity

The following is a result of applying the "within LSR/MLSA connectivity assessment process" to the Shady Pass LSR:

Table VIII-26, Connectivity rankings for Shady Pass LSR.

Connectivity Variable	Dry	Wet	SAF	RR	Overall
% Late-success or Fire Climax	L	H	H	H	H
Open Road Density	L	L	H	M	H
Security Habitat	L	L	H	M	M

Connectivity Variable	Dry	Wet	SAF	RR	Overall
Forest Interior Roads	L	L	L	L	L
% Forest Interior*	L	L	M	M	L

Currently, the availability of habitat in a late-successional or fire-climax condition is high in all vegetation groups except the dry forests. Restoration projects that promote the development of fire-climax conditions would improve the connectivity in this forest group. The overall open road density and level of security habitat provides for a high level of connectivity. However, the existing roads are concentrated in certain vegetation types. The current level of forest interior connectivity is considered to be low, as a result of habitat patches being fragmented by roads. This is a concern for species with low mobility. The percent of each vegetation type in a forest interior will improve over time unless a large-scale disturbance occurs. It should be noted that the ranking for this variable may never be high as a result of natural landscape fragmentation. The amount of habitat within a forest interior needs to be evaluated based upon the ecological capabilities of the site and sustainability on a site-specific basis. Site-specific analysis is also necessary to more adequately address connectivity for the less mobile species. This was not adequately addressed at the coarse/moderate filter approach used in this assessment.

(1) Restoration Opportunities

(a) Dry Forest Group

There is an opportunity to improve connectivity within the dry forest vegetation group through the implementation of thinning, prescribed fires, and road closures with associated revegetation.

(b) Wet Forest Group, Riparian Reserves and Subalpine Fir Forests

There is an opportunity to improve the connectivity within the wet forest group, riparian reserves and the subalpine fir forests by reducing the level of roads in the forest interior patches.

### 3. Disturbance Risk Analysis

Shady Pass LSR contains nearly 10,000 acres of successional-advanced dry forest. Most of this is concentrated on the southern shore of Lake Chelan and along the lower, eastern portion of the Entiat river drainage. Upslope from dry forests are extensive areas of successional-advanced subalpine fir forest and some successional-advanced moist grand fir forest.

Several factors combine to increase the risk of catastrophic fire in the two southern lobes of the Shady Pass LSR: the successional-advanced vegetative condition of the dry forest within the LSR that promotes crowning fires; extensive infestations of Douglas-fir mistletoe that also contribute to crown fires; a higher-than-average probability for a lightning ignition within the Entiat Valley; a steep temperature gradient within the valley that produces strong and shifting wind patterns; and, steep slopes rising from Lake Chelan and the Entiat Valley that can cause fires to spread rapidly. Crown fires originating within the dry forest are likely to spread into adjacent, upslope successional-advanced subalpine fir and moist grand fir forests.

The large amounts of connected, successional-advanced dry forest, subalpine fir forests, and moist grand fir forests are susceptible to outbreaks of western spruce budworm and Douglas-fir tussock moth. Outbreaks are most likely to originate in dry forests and could spread to moist grand fir forests. Cooler temperatures in subalpine fir forests would tend to suppress outbreaks. White pine blister rust infections in mesic forests containing western white pine are a risk to

sustaining upper-elevation whitebark pine which is highly susceptible to this disease. In riparian areas within the subalpine fir series, there is a potential for extensive damage by the spruce beetle (J. Hadfield, pers. comm.). Understory trees in successional-advanced subalpine fir forests are likely to be infected with Indian paint fungus. This disease will remain latent until suppressed trees are released by the death of overstory trees. Heart-rot from the disease will increase the number of soft snags, benefiting cavity excavators and secondary cavity users. Laminated root rot and armillaria root disease centers are probable in stands containing a large proportion of Douglas-fir. Annosum root disease is likely to kill individual, weakened subalpine fir trees in overstocked stands. Each of these diseases will provide snags and logs; disease centers close to adjacent dry forests contribute to the risk of fires spreading into subalpine fir and moist grand fir stands.

Logging records exist since 1910 to the present. Only the lower portion of the southwest arm has been entered. Most entries have been partial harvesting within dry forest types, including several miles along the Upper Entiat riparian corridor. Partial cutting lets more light into a stand, promoting growth of dwarf mistletoes, and increasing infestation severity in residual trees. There has been some clearcutting within adjacent moist grand fir forests. Forests within and adjacent to stands that have been partially harvested are at higher risk to large centers of annosum root diseases and Indian paint fungus than unentered forests.

Aerial surveys conducted by the Insect and Disease Group of Region 6 since the late 1940s indicate the following insect outbreaks occurring within the Shady Pass LSR:

- Western pine beetle: 1951-53, 1958-59, 1963, 1965, 1968-70, 1986, 1993-94
- Mt. pine beetle (lodgepole pine): 1952, 1956, 1970-71, 1978, 1982, 1985, 1988, 1989, 1991-93
- Mt. pine beetle (w. white pine): 1953, 1960, 1962-63, 1965, 1969, 1974-77, 1979-80, 1982-83, 1986-1994
- Mt. pine beetle (ponderosa pine): 1978, 1988, 1992-93
- Douglas-fir beetle: 1953-56; 1962, 1969-70, 1973-76, 1978, 1980, 1988, 1990, 1992
- Spruce beetle: 1956, 1963, 1965, 1986, 1989-92
- Fir engraver: 1961-63, 1965, 1969, 1973-76, 1978-79, 1980, 1982, 1986, 1987-88, 1990
- Western spruce budworm: 1973-77, 1979, 1980, 1985, 1987
- Balsam Woolly Adelgid: 1985, 1988, 1990

Susceptibility of the Shady Pass LSR to fires, insects, and pathogens is shown in Table 65. Mortality from biotic disturbance agents will be greatest where host continuity across the landscape is high and where there is overlapping moderate to high risk among two or more disturbance agents that act synergistically (for example, western spruce budworm and Douglas-fir beetle or fir engraver). Moreover, risk associated with biotic disturbance agents generally elevates the risk of catastrophic fires by potentially increasing fuel levels; this is especially true in the dry forest vegetation group and in vegetation upslope or surrounded by dry forests.

**Table VIII-27, Disturbance Matrix, Shady Pass LSR**



Ve g Ty pe	Fir e	Dwarf mistletoes			Root decay		WPB R	WS B	DFB	MP B	WP B	Total Risk
		PP	DF	WL	AROS	HEAN						
10	L	M	M	L	L	M	-	L	L	L	L	M
11	M	M	M	L	M	M	-	M	L	L	M	M
12	H	H	H	L	M	M	-	H	H	L	H	H
13	H	H	H	L	M	M	-	H	M	L	M	H
30	L	L	M	M	L	M	H	L	L	L	L	M
31	M	L	M	M	L	M	H	L	L	L	L	M
32	M	L	H	H	L	M	H	M	M	L	L	H
33	H	L	H	H	M	H	H	M	M	L	L	H
40	L	-	L	L	L	L	H	L	L	L	L	L
41	M	-	L	L	L	L	H	L	L	H	L	M
42	H	-	L	L	L	L	H	L	M	H	L	M
60	L	-	L	L	L	L	H	L	L	L	L	L
61	L	-	L	L	L	L	H	L	L	M	L	M
62	M	-	L	L	L	M	H	L	M	M	L	M
71	M	-	-	-	L	L	H	L	L	M	L	L

**Key to Column Headings:** PP = Ponderosa Pine, DF = Douglas-fir, WL = Western Larch, PIPO = Ponderosa Pine; PSME = Douglas-fir; LAOC = Western Larch; AROS = Armillaria root disease; HEAN = Annosus root disease; WPBR = White Pine Blister Rust; WSB = Western Spruce Budworm; DFB = Douglas-fir Beetle; MPB = Mountain Pine Beetle; WPB = Western Pine Beetle.

**Key to Letters** “-” = no risk = 0; “L” = low risk, “M” = moderate risk, “H” = high risk

Fifty-three percent of the Shady Pass LSR has a high composite risk to disturbances. Areas at risk include the dense, dry forest types, the partially-harvested dry forests, layered mature moist grand fir, and the layered subalpine fir forests. The latter two types are at high risk both from adjacency to drier forests and because insect and pathogen activity has increased fuel loads and vertical and horizontal fuel connectivity within these vegetation types.

Management strategies to reduce risk of habitat loss to catastrophic wildfires, insects, and pathogens include reducing stand density, altering species compositions, and reducing vertical and horizontal fuel continuity in dry forest types and protecting layered true fir forests from fires originating outside these vegetation types (primarily from lower elevation, dry forest types). Silvicultural and other options to attain objectives within dry forest include thinning (PCT/CT);

pruning; fuelwood collection; mechanical fuel treatments; handpiling fuels; prescribed fire; favoring seral, fire-resistant species such as ponderosa pine, and western larch; and developing or maintaining fuelbreaks. Silvicultural options to protect moist grand fir and subalpine fir forests include treating adjacent dry forest stands as described above; and developing or enhancing fuelbreaks.

#### 4. Northern Spotted Owl

The following is the discussion and results of the within LSR Spotted Owl Module for the Shady Pass LSR. This module reviews the home range sites for spotted owls, as well as connectivity within the LSR. See appendix for order, explanations and process of modules. See Suitable Spotted Owl/Dispersal Habitat and Activity Center map and tables, Forest Interior Map and tables, Riparian Reserve map and tables and Security Habitat map and tables.

##### a) Suitable Spotted Owl Habitat

The Shady Pass LSR has 42,224 acres (55%) of nesting/roosting/foraging habitat, of that 35,897 acres are in the wetter vegetation type and have a high chance of sustainability. There is a potential for the LSR to have 73,792 acres (68%) in suitable habitat, but much of this added acreage would be drier forest and difficult to sustain. The most contiguous (sustainable) suitable spotted owl habitat in the LSR is along the Entiat River valley and along the North Fork Entiat. To meet the recovery goals for the spotted owl, there is a need to increase/accelerate spotted owl habitat, especially accelerating old plantations.

From a Forest-wide perspective, there are 5 LSR/MLSAs that may not provide spotted owl connectivity and sustainability over time, these are Sand MLSA, Swauk LSR, Boundary Butter LSR, Deadhorse LSR, and Shady Pass LSR (see Appendix 1, "Forest Wide Spotted Owl Module" and "Individual LSR/MLSA Spotted Owl Module", Table 2, "Spotted Owl Habitat, and Sustainable Habitat in LSRs/MLSAs" and Table 3 "Summary LSR/MLSA Status & Spotted Owl Pairs Existing and Sustainable on the Forest"). LSR/MLSA spotted owl connectivity and sustainability was analyzed individually and collectively. The Critical Habitat Units were compared with LSRs and MLSAs, to determine if the reserves meet the intent of the CHU needs (connectivity, home range goals, juxtaposition, and range-wide distribution). The existing condition was then compared to the sustainable habitat conditions, for long term spotted owl habitat.

It is recognized that the LSR/MLSAs were designed with the intent that habitat may be lost due to fire or other disturbances, while other LSR/MLSAs will increase in spotted owl habitat as late successional habitat is recovered. However, some LSR/MLSAs are in strategic locations for dispersal, connectivity, genetic interchange. Overtime, there is some question of sustainability of spotted owl habitat in 5 of the 27 LSR/MLSAs. The need is a long-term (>50 years) support for connectivity and home range goals for spotted owls in these LSR/MLSAs and across the province. The sustainability question is due to the amount of dry and mesic forested habitat at risk to fires in these 5 LSR/MLSAs. To strengthen connectivity, home ranges and spotted owl viability, the reserve boundaries could be expanded to include wetter forest and spotted owl home ranges in areas of important connectivity. LSR or MLSA boundary extensions in reserves important for spotted owl connectivity (but low in sustainability) include: Sand MLSA (wetter habitat to the south, including spotted owls inside the CHU WA-12); Swauk LSR (wetter habitat to the north, see Forest-wide spotted owl module); Boundary Butte LSR (wetter habitat to the south, including spotted owls inside the CHU WA-11); Deadhorse LSR (all available wetter habitat is included in the LSR and CHU WA-9, monitor this reserve, no boundary changes are

recommended); and Shady Pass LSR (habitat to the southeast in the Twenty-five Mile Creek CHU WA-4).

### b) Spotted Owl Home Ranges

The Shady Pass LSR will manage for spotted owls over risk in the wetter forests, and have a home range of 60% of 1.8 mile radius, which is 3,994 acres. In drier forests of the LSR, owl habitat will be at 40% threshold, which is 2,663 acres.

A total of four spotted owl activity centers are known within the Shady Pass LSR. Of these, 1 is in dry habitat the other 3 are in wetter. Currently none of these activity centers are below habitat thresholds, these figures will need to be ground truthed and field verified. Three owl sites are at target (wet owls) and one is at threshold (for dry, 2663 to 3994 acres).

There is great potential to restore sustainable habitat in the wetter forest groups for long-term population viability. There is also a need to protect existing habitat and home ranges, especially in sites below threshold and target acreages. Overtime, it is expected that higher quality and more sustainable habitat will be restored to LSR. The drier forests will eventually be managed for other late-successional species.

Table VIII-28, Suitable Spotted Owl Habitat, Shady Pass LSR

	SUITABLE SPOTTED OWL HABITAT <sup>10</sup>											
	1.8 mile Circle Around Activity Center				0.7 mile Circle Around Activity Center				.33 mile Circle Around Activity Center <sup>11</sup>			
Spotted owl	Dry	Mesic	Wet	Total	Dry	Mesic	Wet	Total	Dry	Mesic	Wet	Total
SO205	927	0	2,319	3,245	33	0	607	640	1	0	154	155 mpa
SO502	8	0	5,436	5,444	0	0	724	724	0	0	178	178 m
SO503	257	0	5,102	5,359	78	0	619	697	17	0	155	171 m
SO504	1,021	0	3,465	4,486	285	0	245	529	127	0	11	138 m

<sup>1</sup> Near the LSR or MLSA but not inside the LSR or MLSA.

<sup>2</sup> Spotted owl site overlaps with other LSR/MLSA.

<sup>3</sup> RS = Residential Single; P = Pair; PY = Pair with Young, based on highest occupancy.

<sup>4</sup> FS = Forest Service; PVT = Private Ownership (ownership at activity center).

<sup>5</sup> If the majority of suitable spotted owl habitat in .7 mile circle is dry or mesic, then it is a dry spotted owl. If the majority is wet, then it is a wet spotted owl.

<sup>6</sup> **Below Threshold:** < 2,663 total suitable spotted owl habitat acres in 1.8 mile circle or < 500 total suitable spotted owl habitat acres in 0.7 mile circle.

**At Threshold:** 2,663-3,994 total suitable spotted owl habitat acres in 1.8 mile circle.

**Optimum:** > 3,994 total suitable spotted owl habitat acres in 1.8 mile circle.

<sup>7</sup> The activity center is within 1/2 mile of the CHU.

<sup>8</sup> **Inside** = activity center is at least 600' inside (forest interior) late successional habitat.

**Near** = activity center is inside late successional habitat near forest interior.

<sup>9</sup> Habitat within 1.8 mile circle around activity center. Dry dispersal habitat includes vegetation codes 11, 13, and 52; mesic includes code 21; and wet includes codes 31, 35, 61, and 41.

<sup>10</sup> Dry suitable spotted owl habitat includes vegetation code 12 where size/structure is multistory greater than 9" DBH; mesic includes code 22; and wet includes codes 32, 36, 62, 64, and 42.

<sup>11</sup> A larger circle will be needed if there is less than 100 acres of suitable habitat

Restoration Opportunities: "m" Monitor site; "a" Accelerate habitat around site and home range; "p" Protect what nesting/roosting/foraging habitat exists.

#### c) Spotted Owl Dispersal And Connectivity

During dispersal, nesting, roosting, foraging habitat is used, as well as habitat of lower quality (dispersal habitat). Dispersal habitat includes single story stands, and smaller trees with at least 40% crown closure. Dispersal habitat within the LSR is 9037 acres (12%) and will grow up to be nesting/roosting/foraging habitat. Habitat providing dispersal/Connectivity corridors within the Shady Pass LSR include: Entiat River valley, North Fork Entiat, the high elevation areas, and the dry dispersal areas. see Forest Interior map and Suitable Spotted Owl Habitat Map).

The function of dispersal/connectivity habitat for spotted owls depends on the amount and juxtaposition of late-successional, forest interior, and dispersal habitat. The Shady Pass LSR has 49% in late-successional wetter forest habitat, this could increase. There is good amount of forest interior habitat, it's location is disrupted as a result of natural barriers along the Chelan/Entiat divide. There is a high amount of forest interior, dry habitat, which currently provides good connectivity for spotted owls, but over time is not sustainable. Roading effects connectivity, in that fragmentation usually occurs along roads, and snag reductions for road maintenance cumulatively effects habitat overtime.

Outside the LSR/MLSA network, dispersal habitat is found in all land allocations, and will be provided mainly in Riparian Reserves, in Unmapped LSR's in Matrix and in AMA's, and in wilderness areas (NWFP 1994, . 3-4 pg. 240-241).

In all LSR/MLSA's, except Swauk LSR, Shady Pass LSR, Deadhorse LSR, Boundary Butte LSR, Tumwater MLSA and Sand MLSA, these reserves are predicted to provide the needs for spotted owl recovery over time (50+ years). They will also provide the function the CHUs were designated for. Coupled with the LSR/MLSA management, riparian reserve function, Wilderness areas, and Unmapped LSRs, the needs of the spotted owl will be met. These reserves function for connectivity and spotted owl home ranges. It is concluded that the LSR/MLSA's meet the function of the CHU system, as intended in the NWFP (NWFP C-9). Monitoring and maintaining connections, as well as meeting LSR goals will be ongoing.

#### d) Restoration Opportunities And Potential Projects

1. Meet goals of LSR for 5 pairs of spotted owls.
2. Improve and accelerate N/R/F habitat, to maintain high number of spotted owl pairs.
3. Clear cuts in wet/moist vegetation groups predicted to be habitat in 100 years.
4. Pole sized stands in wet/moist will be habitat in 50 years.
5. Clear cuts in mesic/dry vegetation groups will be habitat in 120 years.

6. Pole sized stands in mesic/dry will be habitat in 70 years.
7. Aggressive protection of remaining suitable spotted owl habitat, from outside LSR.
8. Protect spotted owl home ranges within LSR, between owl circles, by implementing risk reduction on first on non-suitable habitat, then on Dry and Mesic habitat:
9. Fuels reduction and hazard reduction occur outside N/R/F habitat in short term, shift emphasis in 50 years. Accept more risk from fire, manage at high end of spotted owl habitat DC in wet sites. . Spotted owl habitat maintained at 60% of home range in wet and 40% in dry, 500 Acre core area protected, 100 acre activity center protected.
10. Monitor/maintain connectivity outside LSR..
11. Monitor spotted owl activity centers, Acres below Threshold highest priority.
12. Monitor spotted owl activity centers, 500 acre core and home ranges of owls below threshold (see list).
13. Field verify habitat within 500 acre home ranges of spotted owl sites below threshold in that core, but above threshold in the home range:.
14. Increase habitat effectiveness and connectivity by reducing open roads and revegetating road beds. Especially in forest interior habitat patches.
15. Reduce road densities.
16. Maintain dispersal/connectivity habitat.
17. To strengthen connectivity, home ranges and spotted owl viability, expand the reserve boundary to include wetter forest and spotted owl home ranges in areas of important connectivity:
  - Sand MLSA (wetter habitat to the south, including spotted owls inside the CHU WA-12);
  - Swauk LSR (wetter habitat to the north, see Forest-wide spotted owl module);
  - Boundary Butte LSR (wetter habitat to the south, including spotted owls inside the CHU WA-11);
  - Deadhorse LSR (all available wetter habitat is included in the LSR and CHU WA-9, monitor this reserve, no boundary changes are recommended);
  - Shady Pass LSR (habitat to the southeast in the Twenty-five Mile Creek CHU WA-4).

## 5. Aquatic

### a) Summary of Aquatic Goals

- Protect salmonid populations and habitat in core areas in the North Fork Entiat and upper-mid Entiat subwatershed's.
- Prevent increase in water temperature, especially in the Entiat drainage.
- Reduce water temperature in Entiat drainage.
- Minimize fine sediment input especially in the Entiat drainage.
- Increase LWD recruitment potential in North Fork Entiat.
- Reduce groundwater to surface water conversion by roads, especially in landtypes A and B.
- Evaluate road surfacing, maintenance, and culverts especially in landtypes C and C1.

- Reduce or avoid increase in riparian roads in Lake-Silver-Pope and upper-mid Entiat subwatershed's.
- Manage upslope vegetation, roads and activities to increase base flows, and to avoid increase in peak flows, especially in the Entiat basin.
- Preserve and restore all floodplain, side channel, and riparian wetland habitat, especially in C and E channel types in the Entiat drainage.
- Protect and inventory upslope wetlands and ponds.
- Restore natural disturbance regimes within LSR, like landslides, fire, flood, disease as practicable.
- Discourage the spread of brook trout.
- Gather more information on non-salmonid aquatic biota.

b) Key Issues

1. Core fish areas have been identified within and downstream of Shady Pass LSR. Within Entiat, North Fork Entiat is a core area for cutthroat trout; and upper-mid Entiat is a core area for bull trout. Downstream: the mainstem Entiat below Shady Pass LSR contains core areas for bull trout, lamprey, sockeye, spring chinook, and summer/fall chinook.
2. Federal candidate species and other species of concern: bull trout and pacific lamprey populations in the Entiat mainstem could be impacted by LSR management.
3. Anadromous salmonid populations occur within and below Shady Pass LSR. Anadromous salmonids within the LSR include: steelhead, early-run (spring) chinook, and late-run (summer/fall) chinook.

Concerns include low populations that have been severely reduced from historic population levels. Also of concern are within-population genetic and life-history diversity, condition of physical habitat and water quality for incubation, rearing, over-wintering, migration, and spawning; direct human interaction or harvest potentially reducing fitness of individual spawners. All life stages of anadromous salmonids are probably vulnerable to management activities that cause deterioration of riparian habitat.

Anadromous salmonids downstream of Shady Pass LSR: the small sockeye population is presumed to have developed recently, following the damming of the Columbia. The bulk of steelhead and chinook habitat in the Entiat basin is downstream of Shady Pass LSR.

4. Resident salmonids. Redband trout occur throughout the LSR. Cutthroat trout occur in substantial portions of both the Chelan and Entiat drainages of the LSR; North Fork Entiat is a core area for cutthroat trout.

Concerns include maintaining existing populations, protecting against habitat degradation, over-harvest, and competition with non-native species.

5. Introduced species. Eastern Brook trout are known to occur in the Twenty-five Mile, Three-Tommy, and Lake-Silver-Pope subwatershed's, and may occur elsewhere.

Brook trout can have a deleterious genetic impact on bull trout, and may impact other natives through competition for food or habitat. habitat changes, stocking or

other management that would favor brook trout over native species, or would encourage the spread of brook trout, should be avoided.

The introduced mollusk *Corbicula* occurs in the Columbia downstream of Shady Pass LSR.

6. Non-salmonid aquatic biota: We have little data for other aquatic biota in the area.
7. Water temperature. Within the Entiat drainage of Shady Pass LSR, it is important to avoid any increase in water temperature, and to lower water temperatures where possible. Maximum temperature in the Entiat mainstem (above N. Fork) are higher than temperatures in near-by streams, and are within a degree of violating forest plan standards (WNF 1994 monitoring report). Maximum temperature in North Fork Entiat is higher than that in Pope, Potato, and Stormy Creeks (based on elevation, the reverse relationship would have been predicted); maintaining water temperature at or below the current level may be important for maintenance of the core cutthroat population in the North Fork. Downstream of Shady Pass LSR in the mainstem Entiat, temperatures exceed forest plan standards (max. temperature 68 F, WNF 1994 monitoring report) and likely lower the fitness of the Entiat's anadromous populations.

Temperature monitoring between August 14 and October 2 in Twenty-five Mile creek showed the maximum temperatures remained within the range specified in the Wenatchee Forest Plan. Maximum temperature recorded reached 57.2 degrees F.

Managing for lower water temperatures in the LSR could include managing summer low flows, and/or groundwater - surface water partitioning, in addition to riparian shading; this could be accomplished by managing upslope vegetation, soils, and roads in addition to riparian conditions.

8. Sediment transport. Shady Pass LSR lies primarily in a region of sediment input and transport; the mainstem Entiat below Shady Pass LSR is a region of sediment deposition (Carl Davis ref.). Overabundance of fine sediment in the Entiat mainstem (1994 monitoring report) is a major concern given the unique aquatic habitat and key populations here. See discussions of flow, fine sediment, roads, disturbance regimes, and channel type for management actions that may mitigate downstream fine sediment levels.

Fine sediment. No fine sediment data are available within Shady Pass LSR. Sediment samples taken in 1995, in the Entiat mainstem below the LSR in Lake-Silver-Pope show that the bed has 15% fines. Further downstream in the deposition reach on private land, fines were found to be at 21%. This reach is flatter than the upstream areas, has active floodplains and contains spawning gravel. Per cent fine sediment within this reach is a concern as it exceeding forest plan standards and potentially reducing the fitness of anadromous and sensitive populations.

Sediment input in an upper reach will eventually works downstream and may deposit in the spawning reach. Thus, although the sediment levels on Forest lands are within Forest Plan standard in the upper reaches, effects of sediment deposition in the key spawning reach needs to be considered during project planning.

9. Channel complexity. Channel complexity has implications for fish habitat and for the hydrologic regime (hydraulic retentivity). Components of channel complexity include: large woody debris (LWD), pool abundance, pool type, pool depth, width:depth ratio, substrate diversity, sinuosity, cover, undercut banks, bank vegetation, riparian vegetation, roughness

coefficient, hydraulic retentivity, riparian wetlands, side channels, high flow refugia, and floodplain connectivity.

LWD plays key roles in stream bed and stream bank stability, flow energy dissipation, fines/gravel retention, sinuosity, pool formation, side channel creation, in channel shade, nutrient retention (e.g. deciduous leaves, salmon carcasses), and nutrient input. Single pieces function differently from interwoven masses of LWD known as complexes.

Input mechanisms: small scale riparian disturbances to large scale hillslope disturbances. Management can impact aquatic LWD regimes in a number of ways including: removal from channel; removal from floodplain (down and/or potential); alteration of floodplain area or of frequency of "small" floods; removal from hillslope; or alteration of disturbance regimes controlling input (landslides, avalanches, fire, flood, disease).

Riparian road density is often inversely related to channel complexity. Our information on channel complexity is far from complete; riparian road density by subwatershed is available forest-wide, and LWD and pool abundance data are available for selected (R6 protocol - surveyed) streams.

The Chelan drainage of Shady Pass LSR has better channel structure conditions. The ratio of riparian road miles to stream channel miles is very low ( $<.01$ ) in all subwatershed's except Twenty-five Mile, where the ratio is moderate ( $<.25$ ). LWD and pool data are available for four reaches in the Twenty-five Mile drainage: LWD abundance is excellent, pool numbers are moderate, and abundance of deep pools (max. depth  $\geq 3$  ft) is good (see figure xxx).

In the Entiat drainage of Shady Pass LSR there are no known severe concerns for channel structure; however pool and deep pool abundance are below forest plan standards throughout, and LWD abundance is below forest plan standards in North Fork Entiat subwatershed.

Riparian roads are low (ratio  $<.1$ ) in North Fork, upper Entiat, and Tommy-Three subwatershed's and moderate (ratio  $<.25$ ) in Lake-Silver-Pope and upper-mid Entiat. In the North Fork subwatershed, pool and deep pool abundance are low but not dissimilar to the adjacent wilderness, and LWD abundance is generally below forest plan standards. In lower Three Creek, pool and deep pool abundance are similar to those in North Fork subwatershed; however LWD abundance is good. In upper Entiat subwatershed, pool and deep pool abundance are moderate to low while LWD abundance is good to fair. Downstream of Shady Pass LSR in the mainstem Entiat, pool, deep pool, and LWD abundance are good.

10. Aquatic nutrient cycling depends in part on riparian understory vegetation, groundwater/surface water partitioning, in-channel LWD, hydraulic retentivity, pool depth and character, macroinvertebrate community structure, mass wasting disturbance regime, and returning anadromous biomass. We have inadequate data to evaluate aquatic nutrient cycling in Shady Pass LSR at this time; however we can be aware of it when managing any of the above inter-related factors.
11. Landtype. Shady Pass LSR includes A, B, C, and C1 landtypes (see Landtype Associations Response Map, Appendix 21). Bear Creek (Chelan), the Entiat above North Fork, and N. Fork. Entiat are predominantly Landtypes A and B; the rest of the LSR is predominantly landtype C; landtype C1 occurs between Graham Harbor and Twin Harbor on the south



shore of Lake Chelan. In Landtypes A and B the major valleys have a well regulated hydrologic response with high subsurface water storage and therefore less of a drop at summer low flow; they also have relatively high debris slide hazard and corresponding high coarse sediment delivery. Ridgetops, valley walls and cirques in landtypes A and B have high surface runoff, high first order stream density and high bedrock exposure. Roads in landtypes A and B may intercept groundwater, converting it to surface water (with implications for flow regime, sediment input, and water temperature). Rooding or harvesting in these landtypes may increase debris slide frequency. Road management will be important in these landtypes in Shady Pass LSR given temperature, fine sediment, LWD, and aquatic biota concerns.

Landtypes C and C1 have moderate to high surface runoff, high sediment delivery, high surface erosion and high hazard of shallow rapid failures. Landtype C1 inputs mainly fine sediments to stream channels, while landtype C inputs a range of sediment sizes from fine to coarse. Rooding these landtypes could exacerbate their natural tendency toward high fine sediment production. Road management will be important in these landtypes in Shady Pass LSR given fine sediment concerns, especially in the Entiat drainage.

12. Channel type. In the absence of human influence, valley shape and geology determine the basic character of the stream channel flowing within. A steep boulder torrent, a moderate but continual step - pool - step, a broad meandering river, or a cliff-lined canyon, present different opportunities for aquatic biota. A given organism might require a number of different channel types for different aspects of its life. Various classification systems, such as Rosgen, have been constructed to characterize these differences. Common and fundamental to all systems are: 1) channel gradient, 2) channel confinement (the ability of the stream to move back and forth, or express sinuosity, often quantified as the width of the valley floor relative to the width of the channel), and 3) substrate size (whether the local geology provides huge boulders, moderate cobbles, or only sand and silt to the channel).

Channel type is a fundamental constraint on many other aquatic habitat parameters. The pools found in a steep boulder torrent will be fundamentally different from those in a broad meandering river in abundance, type, and depth. Human influences can alter conditions within a channel type (a meandering river could become shallower, silt filled, and lacking in riparian cover) or the channel type (a deep winding meadow trout stream could become a downcutting gully). If the channel type itself has been altered. It may never be possible to return a stream to its original condition ; however it may be possible to improve the channel condition that moves it toward the characteristics of the original, or at least stabilizes the channel (for example prevent further downcutting).

Channel types vary not only in their natural character (or range of variability of key parameters) but vary also in which human actions they respond to, the degree of their response, and how the response is manifested

An historic channel type analysis of Shady Pass LSR needs to be done. As a broad generalization, "A" (high gradient) channel types may present the greatest slope failure concerns, "B" (moderate gradient) channel types may be most stable and most resistant to management impacts and "C" and "E" (low gradient) channel types may be the most sensitive to on-site or upstream management impacts. C and E channel types provide key unique habitat for salmonids and other biota.

Within Shady Pass LSR the "A" channels are responding as described, the "C" and "E" channels are reacting to upstream management impacts.

Meadows adjacent to C and E channel types may be priority for riparian road removal, human recreation reduction, and reduction in riparian grazing impact.

13. Peak flows. While floods have been a concern in the Entiat basin, particularly in conjunction with fire disturbance, there is little information about natural pre-Euro-American regimes. Some moderate peak flow events are necessary to maintain the substrate and channel conditions required by salmonids and other biota.

Protection of C and E channel meadows, side channels, and other floodplain areas, and careful upslope (vegetation, soil, wetland, road, grazing and recreation) management will help mitigate peak flow impacts on humans.

14. While normal low flows are necessary for salmonids and other biota, extreme low flows can strand organisms, reduce habitat, create passage barriers, reduce water temperatures, and reduce the stream's ability to transport fine sediments. The management factors above that mitigate peak flows will also mitigate low flows.
15. Water withdrawals. An estimated 10% to 12% of the water in the Entiat River is being withdrawn before it reaches the Columbia River. (Mullen, et. al, 1992)
16. Road density. Road density is related to many other issues including fine sediment, mass failures (biotic passage barriers, coarse sediment input, LWD input), effective channel network (increased), hydrograph (peak flows, low flows, water temperature, biotic migration/passage, water/sediment balance, aggradation/degradation), groundwater/surface water partitioning (areas of groundwater upwelling have been documented as key winter thermal refugia for salmonids and may support unique flora/fauna; this is also a water temperature issue). Riparian roads have additional issues of floodplain loss, channel constriction and simplification and human presence (potential harvest, disturbance of spawning, habitat degradation, introduction of non-natives).

Total riparian road density in Riparian Reserves are 2.28 miles per square mile. The Riparian Reserves are estimated as 6,832 acres of the 76,502 acres within Shady Pass LSR.

Road management strategies include: 1) relocating riparian roads, 2) reducing the abundance of upslope roads to leave only a well planned core access network, and 3) reducing road-related surface erosion through such actions as frequent maintenance, surfacing, outslowing, drivable dips, seasonal closures cut-and-fill plantings or coverings, and culvert replacement or maintenance. These management actions are predicted to lead to immediate, long-term, widespread "improvements." Allowing the Riparian Reserves to return towards the natural condition of the water/sediment balance, fine sediment abundance, channel complexity, riparian health, and water temperature. Because of a high probability of improvement, and because these are fundamental parameters within which finer scale parameters (such as spawning gravel condition or pool abundance and depth) operate, road repair is generally a management action of high priority, high return, low risk, and nearly universal applicability.

In Shady Pass LSR, subwatershed-wide road densities are highest in Twenty-five Mile Creek, upper-mid Entiat, and Lake-Silver-Pope. Road densities are lowest (<.1 mile per sq. mi.) in Bear (Chelan) and south shore Lake Chelan.

17. Upslope vegetation has profound importance for the yearly streamflow pattern (hydrograph), affecting peak flows, low flows, and total yearly flow, as well as the timing of these flows. Percent canopy closure, or clear-cut acres, are measures often used to address this issue. Human management may have reduced canopy in the watershed (usually through timber harvest) or increased canopy in the watershed (usually through fire exclusion). Overstory canopy may have the greatest effect but understory vegetation, condition of the duff layer, and soil compaction are inter-related and also important, particularly in areas of drier climate. Vegetation, climate (precipitation patterns, rain-on-snow probabilities, and lightening strike patterns), and landtype interact
18. Floodplain connectivity. Much of the channel within the Shady Pass LSR is "A" type. The "A" type typically has narrow channel width and minimal floodplain. The stream sources are hanging valleys, they are relatively inaccessible for management activities. The lower portions of the drainage, those below the LSR have channel types that have more room for floodplain activity. Historic photos might reveal changes in off-channel habitat, floodplain area and riparian wetland habitat over time.
19. Upslope wetlands and ponds may serve as "islands" and/or refugia for aquatic biota, especially those amphibians that do not co-exist with salmonids. They also have important roles in regulating summer base flows in the watershed. We have information regarding wetland locations (see wildlife write-up) but little understanding of alterations in their ecosystem functions over the recent century.

As a broad generalization wetlands, especially in late-successional forests and/or hanging valleys (such as those in the Lake-Silver-Pope subwatershed), may be havens of biodiversity warranting very conservative management until better inventoried and understood.

20. Disturbance Regimes. We have come to recognize that suppression or alteration of natural disturbance regimes can lead to fundamental long-term resource change. This in turn has led to the realization that minimum viable populations or habitats must be large enough to withstand moderate disturbances. A complete description of natural disturbance regimes, their relationship to landtype, climate, and other factors, and their ecosystem roles, is still lacking. Aquatic systems are now seen to depend on disturbance by fire, flood, insect/disease, and landslides for input of the raw materials of channel construction, such as LWD and coarse substrate. Generating a disturbance regime that "safely" approximates "natural" disturbance results is currently one of our greatest challenges.

In the Entiat basin a high priority may be upslope and riparian hydrologic management to prevent disturbances from impacting human resources through flooding.

The LSR/MLSA system comprises a set of landscape patches where retention or recreation of primeval conditions is emphasized, allowing the maintenance of wildlife dependent on these conditions. From the aquatic perspective, we consider how this system of reserves and the aquatic corridors that link them can be managed for maximal viability of native aquatic species and the habitat conditions in which they evolved.

Although historic aquatic conditions are not known to the degree desirable this much is clear: many aquatic populations have lost some of their spatial, temporal, and genetic "safeguards;" the nature of the disturbances they experience has changed; individual health/reserves may be reduced (for example salmon enduring longer migration times concurrent with higher temperatures); and habitat conditions have declined in non-random ways, fragmenting

populations. The LSR/MLSA network has the potential to strengthen viability of these at-risk aquatic populations.

Some recommendations to avoid increasing aquatic risks for Shady Pass LSR are listed here by drainage.

**Entiat drainage:**

1. Avoid management activities that could cause increases in fine sediment input, water temperature and compaction (ground water to surface water conversion).
2. Avoid reduction in riparian canopy cover.
3. Avoid increases in road density, especially Upper-mid Entiat and Lake, Silver, Pope drainages.
4. Be aware of debris slide hazard in land types A and B.
5. Be aware of hazard of activities in land types C and C1 that have erosion and shallow rapid failure hazards. (Lake, Silver, Pope and Upper Entiat drainages)

**Chelan drainage**

1. Avoid increases in road density, especially Twenty-five Mile drainage.
2. Be aware of debris slide hazard in land types A and B.
3. Be aware of hazard of activities in land types C and C1 that have erosion and shallow rapid failure hazards.

## **6. Noxious Weeds**

A portion of the Shady Pass was surveyed in 1992 for noxious weed species that occur along roadsides (McRae and Harrod unpubl. report). High densities of *Centaurea diffusa* are present along roads in the area of Twenty-five Mile Creek. *Linaria dalmatica* is a species which is widespread outside the LSR and would be a priority for containment and prevention of further spread (refer to Noxious Weed Analysis Module in Appendix 1). Current information is lacking regarding the presence of other noxious weed species within the Shady Pass LSR. Survey for species presence and extent should be completed in order to develop a noxious management plan for this LSR (refer to Harrod 1994).

## **7. Fire Management Plan**

### **a) Overview**

This plan is intended to provide guidance for the management of fire in the Shady Pass LSR. It is intended to supplement the Fire Management Plan for the Late Successional Reserve System and will become a portion of the Fire Management Action Plan for the Wenatchee National Forest.

The disturbance regimes for the vegetation groups have been described in a separate portion of this plan. It is the intent of this plan to provide adequate protection of the Reserve to allow management practices to be initiated which will provide for the protection of the Late Successional Associated species and associated unique habitats. These management actions are expected to include actions which will include the role of fire disturbance as an important process in the reserve.

b) Fire Prevention Actions

The following actions are site specific for the Shady Pass LSR. They are intended to supplement the actions which will be implemented on a Forest wide basis.

1. Continue to implement campfire restrictions below 3,000' in the Lake Chelan Drainage. Add additional restrictions as warranted by increased fire danger.
2. Emphasize campfire restrictions as warranted during Mule Deer and other hunting seasons.
3. Initiate hazard reduction around developed and dispersed recreation sites such as:
  - Grouse Mt.
  - Big Creek
  - Cottonwood
  - Graham Harbor
  - Twin Harbor
4. Emphasize fire prevention activities in the 25 Mile Creek Drainage .
5. Continue and improve fire prevention signing program on roads and trails included or adjacent to the LSR.
6. Make hunter education, particularly during the High Hunt, an emphasis item
7. Implement road restrictions and closures as warranted during periods of extreme fire danger.
8. Emphasize contact with the following special interest groups. Lake Chelan Boat Company, Backcountry Horseman, ORV groups.
9. As a hazard reduction measure emphasize fuel wood collection around recreation use sites in the dry forest type.

c) Pre-fire Protection for Fires Originating Outside the LSR

The following methods are proposed to protect the LSR from fires originating outside LSR boundaries.

1. Maintain and manage existing fuel breaks
2. Complete pre-attack planning process for LSR utilize natural fuel breaks
3. Stress prevention of fires outside LSR boundaries
4. Strategic fuel manipulation within and adjacent to LSR boundaries (live and dead)

d) Fire Detection -

1. Staffing of Tyee L.O. and aerial detection after lightning episodes will provide the primary detection resource for this LSR.
2. This will be supplemented by emergency staffing at Junior Point during and after lightning episodes
3. Supplementation by L.C. Boat Company and L.C. Airways - fire reports

e) Fire Suppression

1. Spotted owl activity centers are the highest priority for protection of resources (following protection of human life and improvements). All wildfires in the 1.8 mile buffer will be suppressed at minimum acres.
2. Rapid, aggressive initial attack will occur on all dry site ecosystems until vegetation management projects have modified the vegetative condition to where it is in synchrony with inherent disturbance regimes.
3. Rapid initial attack will occur on all ignitions in Critical Habitat Units, with minimum disturbance as a goal
4. Until vegetation conditions have been modified, initial attack should occur on all fires below 5,000 ft; normal policy (FSA, Escaped Fire Situation Analysis)
5. Ignitions above 5000' will be considered candidate fires and may be managed as prescribed fires after prescribed plans are completed
6. Protection of riparian areas from fires and from suppression activities is a priority
7. Improvements will be a priority for protection (Lone Peak Seed Orchard, recreation facilities, etc.)
8. Adjust pre-planned dispatch runcards in LSR area
  - Use of retardant is appropriate on initial attack
  - Use of air-delivered firefighters is appropriate
  - Use of dozers need District Ranger's approval
  - Use of burning out is appropriate strategy as situation dictates
  - Escaped Fire Situation Analysis process will be used to guide large fire suppression efforts. Utilize pre-attack plans and materials. These may be prepared in advanced and updated annually prior to the fire season.

f) Vegetation Management

1. Returning dry forest types to historic conditions is a priority. Suggested activities include pruning, thinning, commercial and pre-commercial thinning, wood gathering, and prescribed fire
2. High density, multi-story refugia in mesic sites will be maintained.
3. Fuels management in lodgepole pine is not a high priority (stand-replacing fires are within inherent disturbance regime)
4. Prevent the spread of noxious weeds as feasible
5. Prescribed fire projects in whitebark pine/subalpine larch ecosystems are encouraged to increase amounts of whitebark pine
6. Maintain a mosaic of age classes and structural conditions across the landscape outside dry forest to support Late Successional species

g) Prescribed Fires Opportunities

1. The development and subsequent implementation of prescribed fire plans should be a priority for this LSR

2. Priorities for the use of prescribed fire are dry site ecosystems and whitebark pine ecosystems
3. Priority outcomes are hazard reduction near improved sites.
4. Projects should be of scale/location to enhance landscape-level diversity tied to inherent disturbance regime
5. Projects should attempt to minimize risk of future catastrophic wildfires (those outside the range of inherent disturbance regimes with respect to size and/or severity)

### D. Restoration Opportunities and Potential Project Summary

Table VIII-29, Restoration Opportunities and Potential Projects, Shady Pass LSR

Analysis Module	Restoration Opportunity	Potential Projects	Schedule <sup>1</sup>
Forest-Wide Sustainability	1) Reduce fuel loading and stocking levels in dense successional advanced dry forest stands where they exist between the Shady Pass and Lucerne LSR's..	1) Potential projects are limited due to the wilderness land allocation for this area. Prescribed Natural Fire is the only potential option for reducing fuels. This is likely to be unrealistic due to the nature of the fuels.	
Forest-Wide Spotted owl	Not Applicable. (This LSR is not one of the 3 LSR's on the forest designated as a source population area.)	Not Applicable.	
Forest-Wide Connectivity	1) Promote the development of fire climax stands within the dry forest vegetation group.	1) Thin from below favoring ponderosa pine.	A
Unique Habitats & Species	1) Reduce road densities in riparian reserves and in talus areas.	Close or relocate roads as opportunities are identified in Access and Travel Management Planning.	A
	2) Maintain existing subalpine meadows.	2) Remove encroaching conifers from meadows.	C
	3) Increase the amount of interior forest area within the LSR.	3) Close roads near interior forest areas as opportunities are identified through Access and Travel Management Planning.	A
	4) Retain whitebark pine acreage within the LSR.	4) Prescribed fire.	C
Connectivity Within	1) Promote the development of fire climax stands within the dry forest vegetation	1) Thin from below favoring ponderosa pine. Use prescribed fire where current fuel loadings	A

<b>Analysis Module</b>	<b>Restoration Opportunity</b>	<b>Potential Projects</b>	<b>Schedule<sup>1</sup></b>
<b>the LSR</b>	group.	permit the attainment of objectives.	
	2) Increase the amount of interior forest area within the LSR.	2) Close roads near interior forest an in dry forest areas as opportunities are identified through Access and Travel Management Planning.	A
<b>Disturbance</b>	1) Reduce the risk of habitat loss to wildfire by reducing stand density, altering species composition and reducing vertical and horizontal fuel continuity in dry forest types.	1) Use commercial thinning, pruning, fuelwood collection and prescribed fire as described in disturbance module treatment key. Favor the development of seral species such as ponderosa pine.	A
	2) Protect layered true fir forests from fire originating outside these types, primarily lower elevation dry forest types.	2) Use treatments described in #1 above in the adjacent dry forest types.	B
	3) Minimize the extent of stand replacement fires within the LSR and minimize the spread of fire from Shady Pass to other LSR's.	3) Maintain existing fuelbreak and develop additional fuelbreak at key ridgetop locations.	C
<b>Spotted Owl</b>	1) See Appendix 39, "Northern Spotted Owl Nest Site Protection Within LSRs and MLSAs"		A
	2) Maintain 500 acres of nesting habitat within the four Shady pass spotted owl activity centers.	2) No Ground or vegetation disturbing activity in spotted owl 504 nesting area.	A
	3) Rehabilitate or accelerate habitat recovery around activity centers 504 and 205.	3) Plant PP and DF in activity center 504 and DF in activity center 205. Fertilize young trees to accelerate growth.	C
	4) Improve sustainability of dense stands in 503 activity center.	4) Thin up to 257 acres within the 1.8 mile activity center.	A
	5) Improve sustainability of dense dry forest (vegetation	5) Utilize commercial thinning, pruning and fuelwood collection.	A

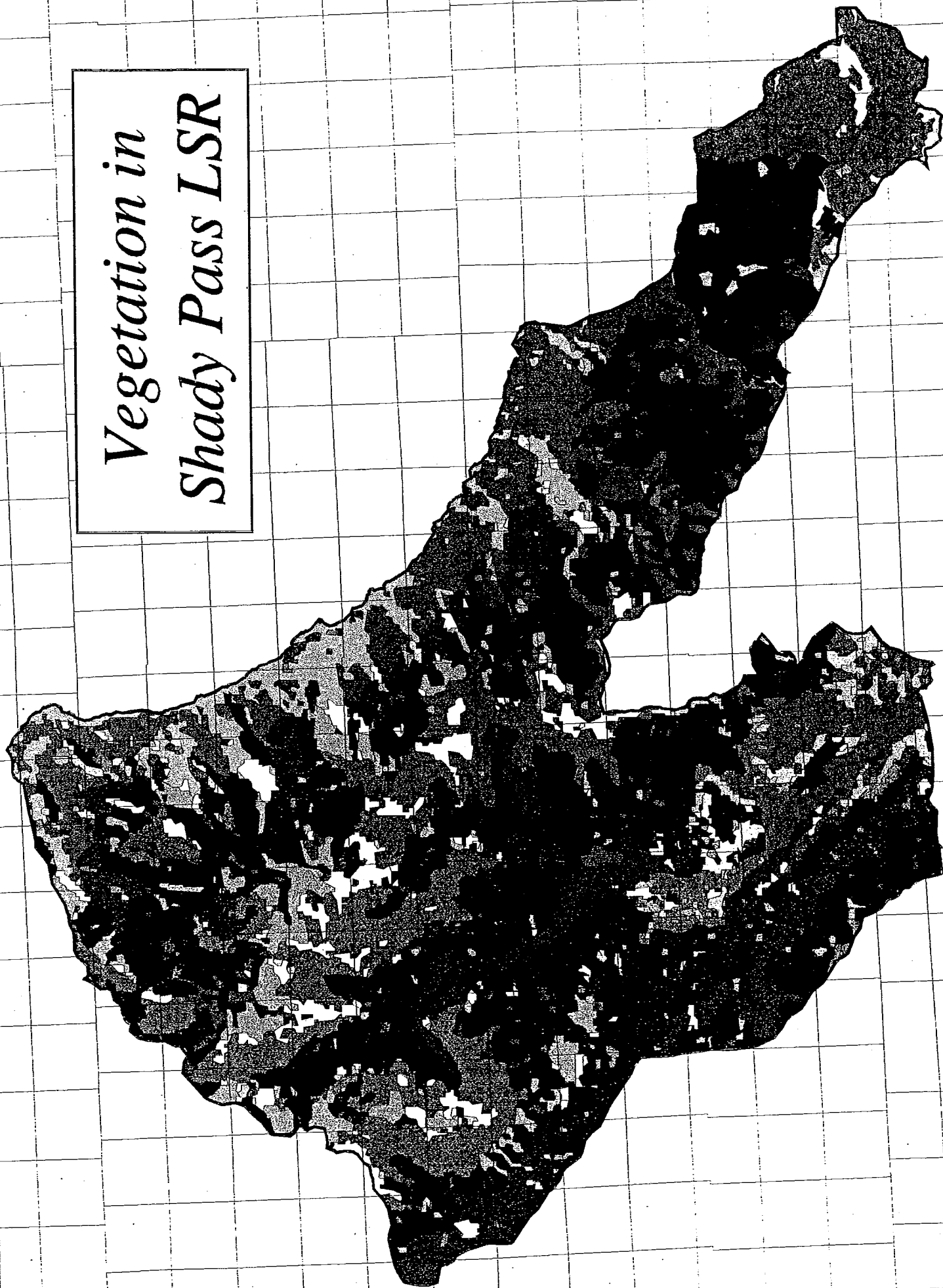


Analysis Module	Restoration Opportunity	Potential Projects	Schedule <sup>1</sup>
	Type 12) within 0.7 to 1.8 mile home range area on threshold acres. Treatment should maintain suitability of habitat for nesting, roosting and foraging. (see spotted owl desired conditions)		
	6) Improve habitat quality in dense single story stands in activity centers 502 and 503	6) Thin to create layered canopy development.	A
	7) Obtain information on spotted owl locations.	7) Survey areas to 1994 spotted owl protocol.	B
	8) Accelerate the development of suitable spotted owl habitat.	8) Utilize silvicultural activities that accelerate the development of multi-layered stands. Focus on single layered pole size stands in moist grand fir and wet forest groups.	C
<b>Aquatic</b>	1) See goals listed in Aquatic section for Shady Pass	1) Coordinate projects with Entiat and Chelan Watershed Assessments.	
<b>Noxious Weed</b>	1) Limit the extent and spread of <i>Centaurea diffusa</i> in twenty five mile creek area.	1) Consider treatments such as hand pulling and herbicides to limit extent and spread.	A
	2) Prevent invasion of <i>Linaria dalmatica</i> from nearby areas.	2) Use combination of treatments that prevent spread of this weed into Shady Pass.	B
	3) Increase knowledge regarding noxious weed presence in Shady Pass LSR.	3) Survey LSR for presence of noxious weeds.	C
<b>Fire Plan</b>	1) Protect LS values from loss due to wildfire	1) See fire plan for specific actions	

<sup>1</sup> Implementation Schedule; (A) = within 1 year; (B) = within 3 years; (C) = within 5 years

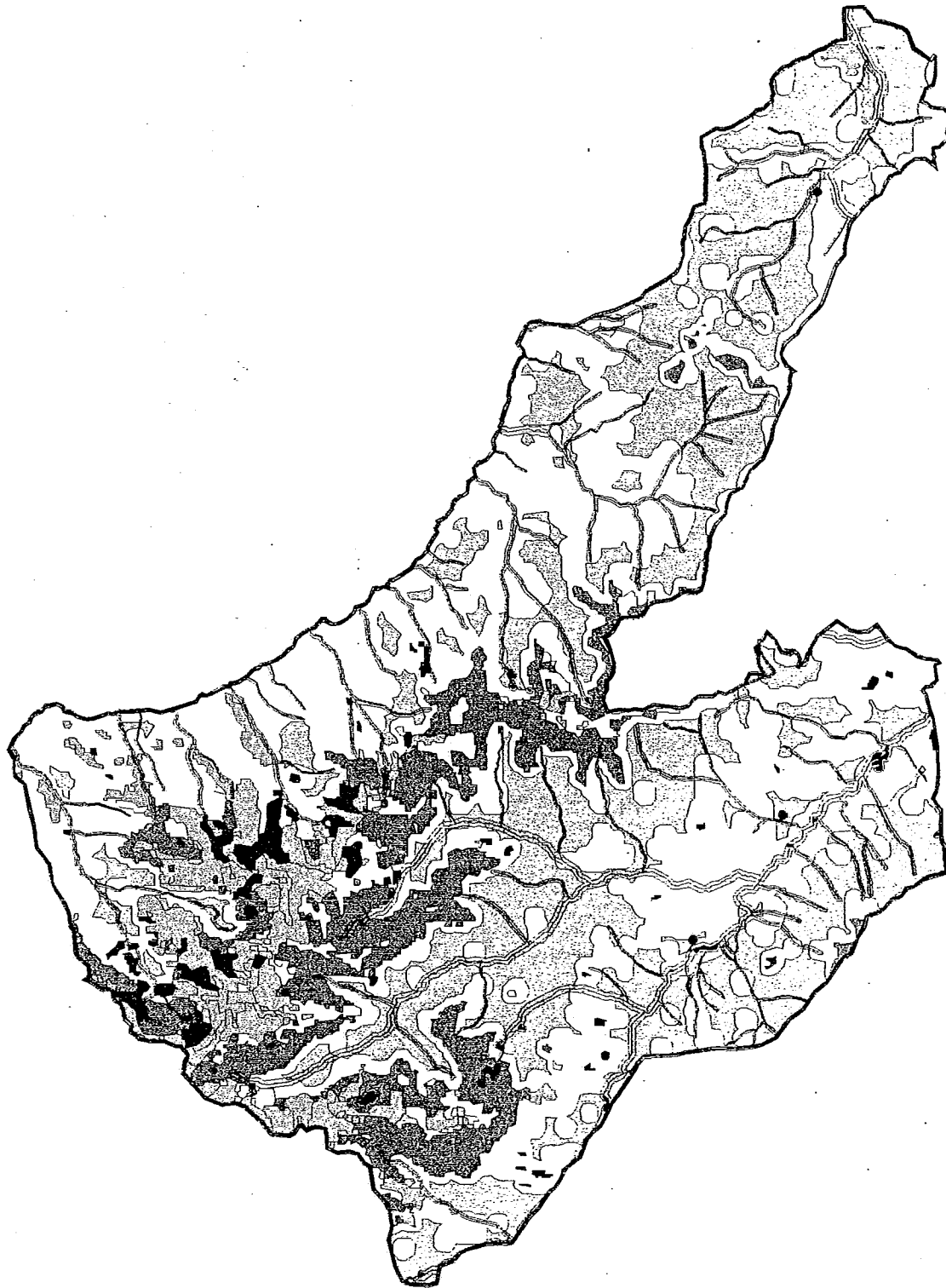
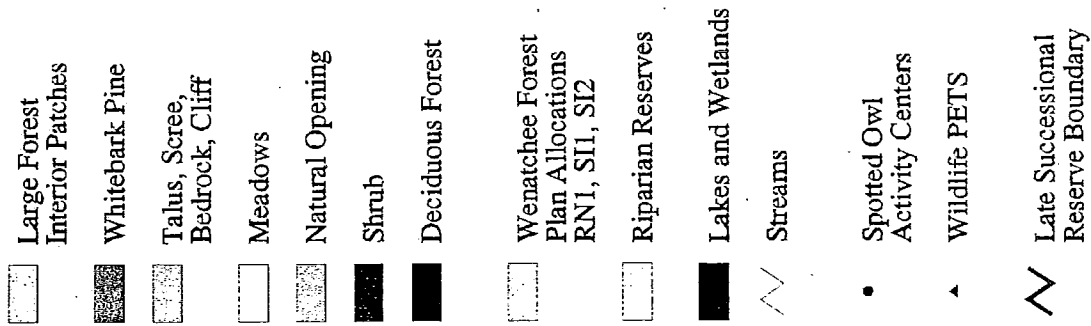


*Vegetation in  
Shady Pass LSR*



# Shady Pass Late Successional Reserve

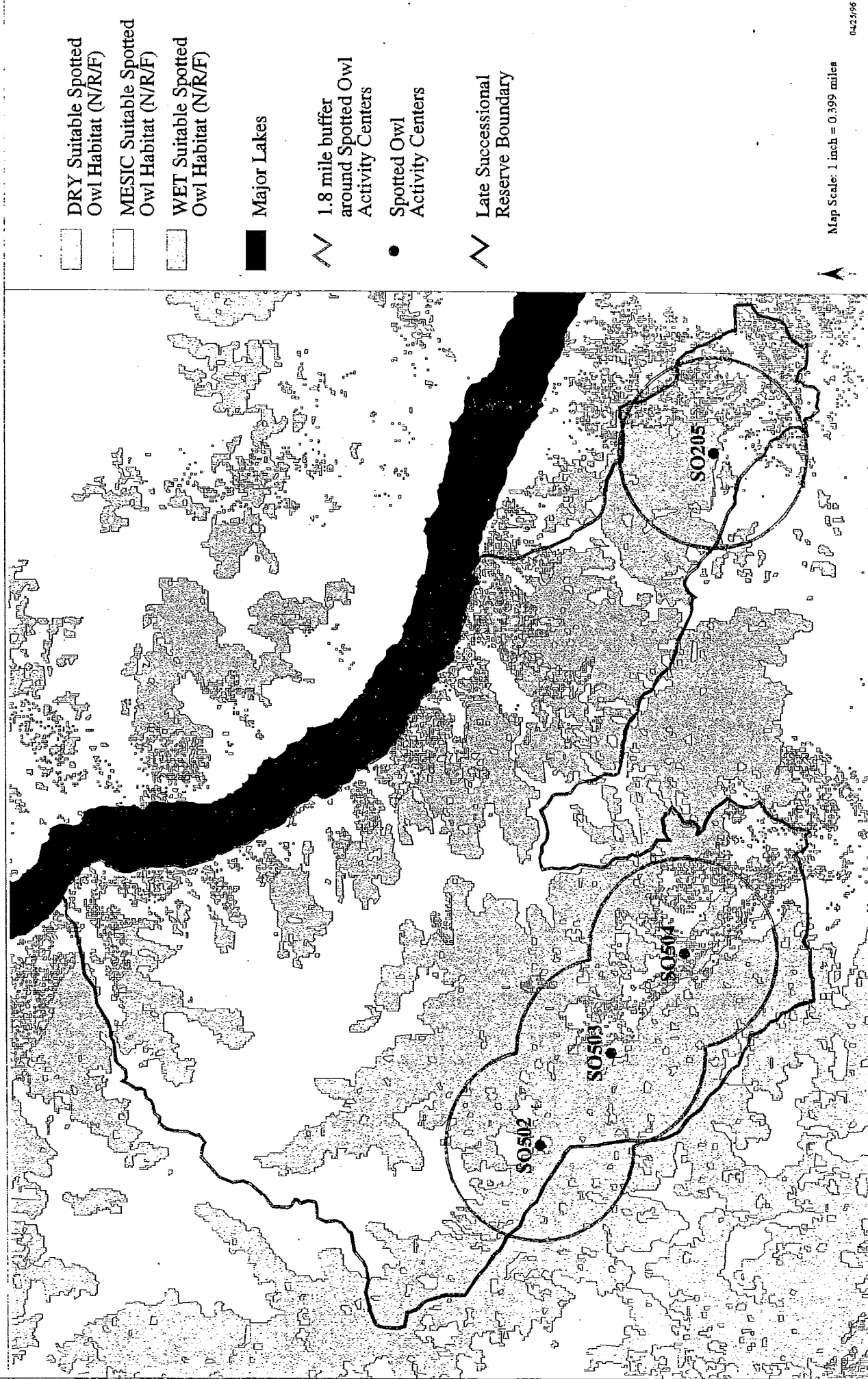
## UNIQUE HABITATS



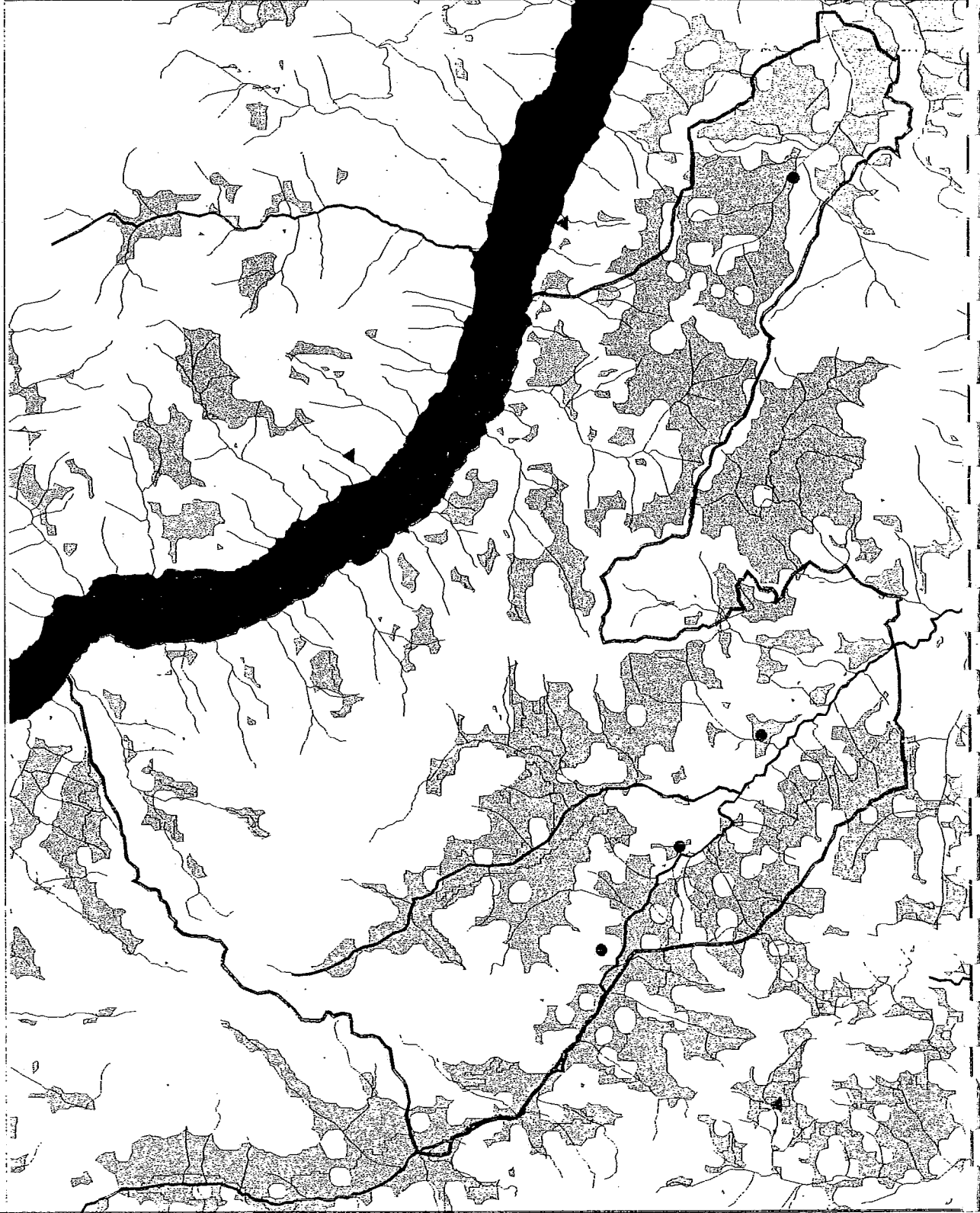
Map Scale: 1 inch = 0.399 miles

# Shady Pass Late Successional Reserve

## SUITABLE SPOTTED OWL HABITAT



# *Shady Pass Late Successional Reserve* **FOREST INTERIOR**

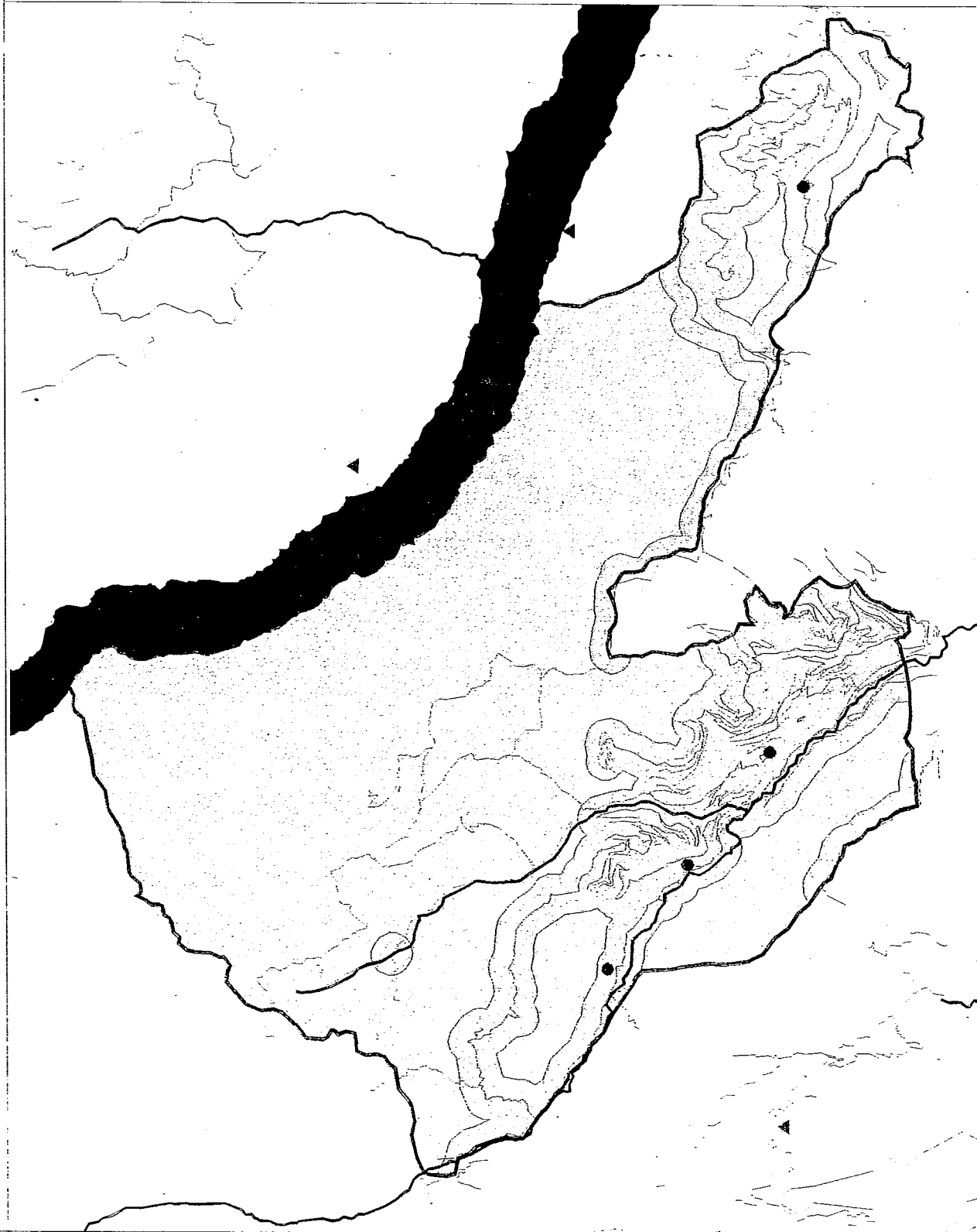


- DRY Forest Interior
- MOIST Forest Interior
- HIGH Forest Interior
- Major Lakes
- Streams
- Major Streams
- Spotted Owl Activity Centers
- Wildlife PETS
- Late Successional Reserve Boundary

Map Scale: 1 inch = 0.399 miles

# *Shady Pass Late Successional Reserve*

## **SECURITY HABITAT**



Security Habitat  
NOT Security Habitat  
Major Lakes

Open roads and  
motorized trails  
Closed roads and  
non-motorized trails  
Major Streams

Spotted Owl  
Activity Centers

Wildlife PETS

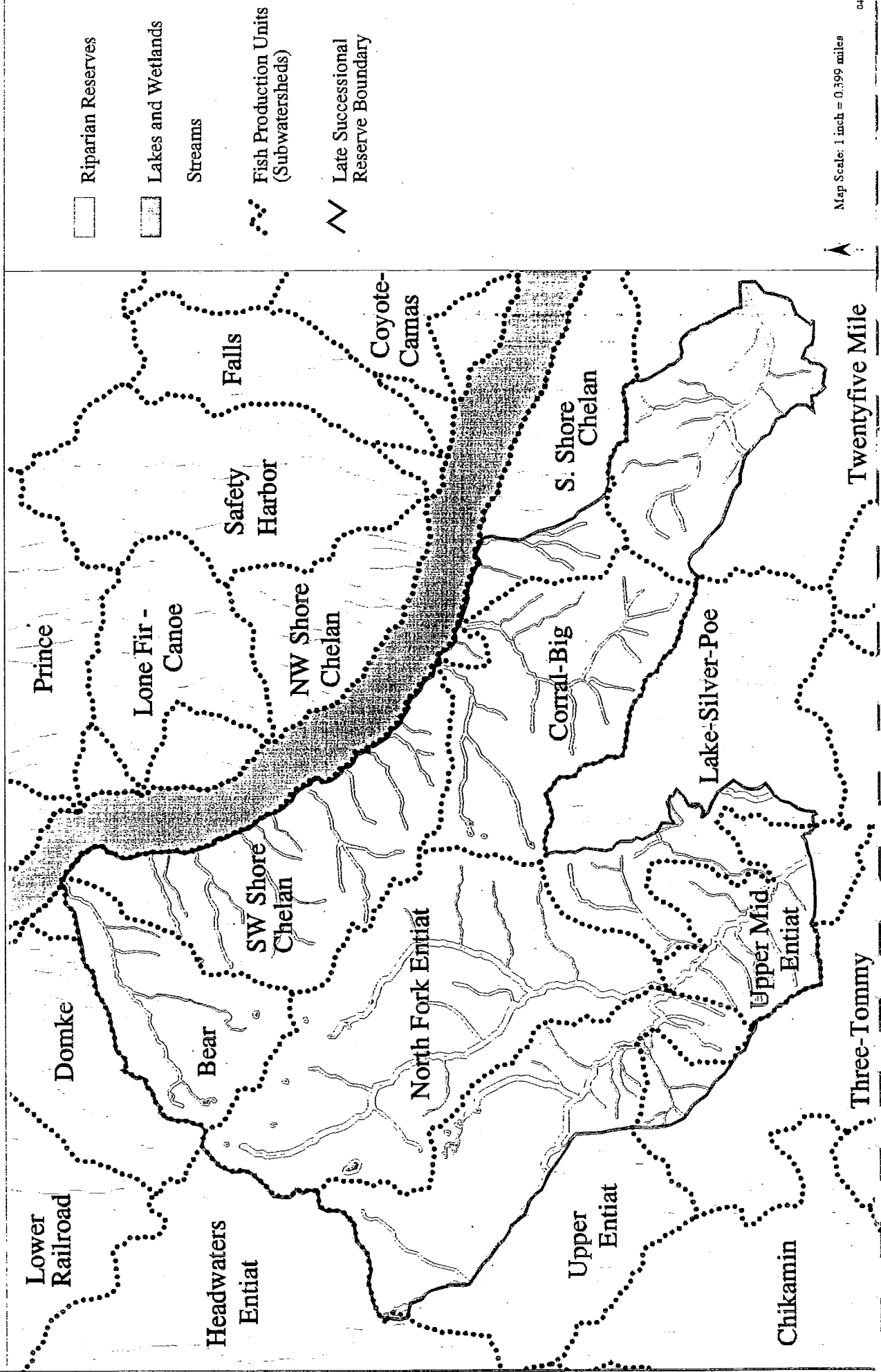
Late Successional  
Reserve Boundary



Map Scale: 1 inch = 0.399 miles

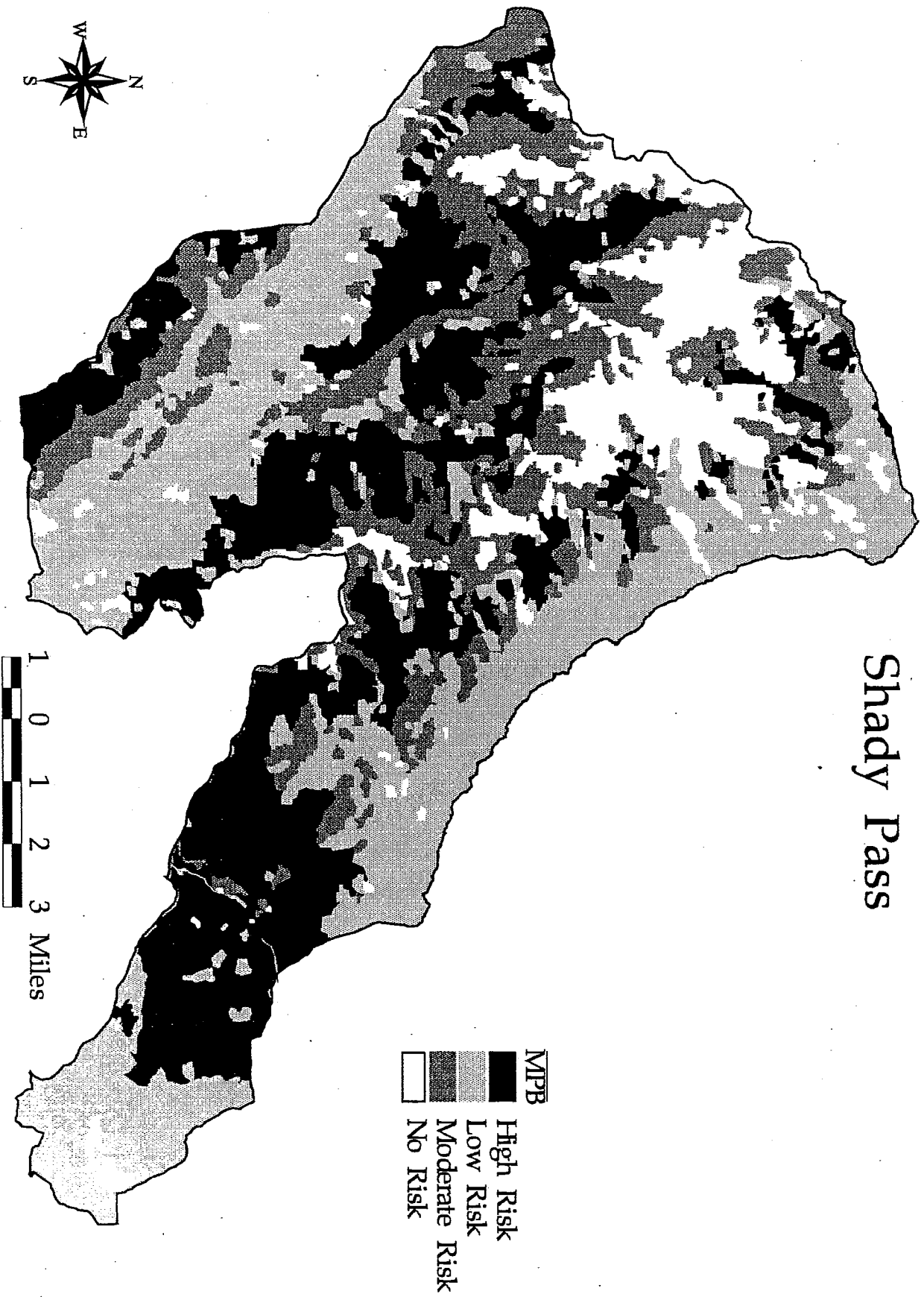
# Shady Pass Late Successional Reserve

## FISH PRODUCTION UNITS (SUBWATERSHEDS)

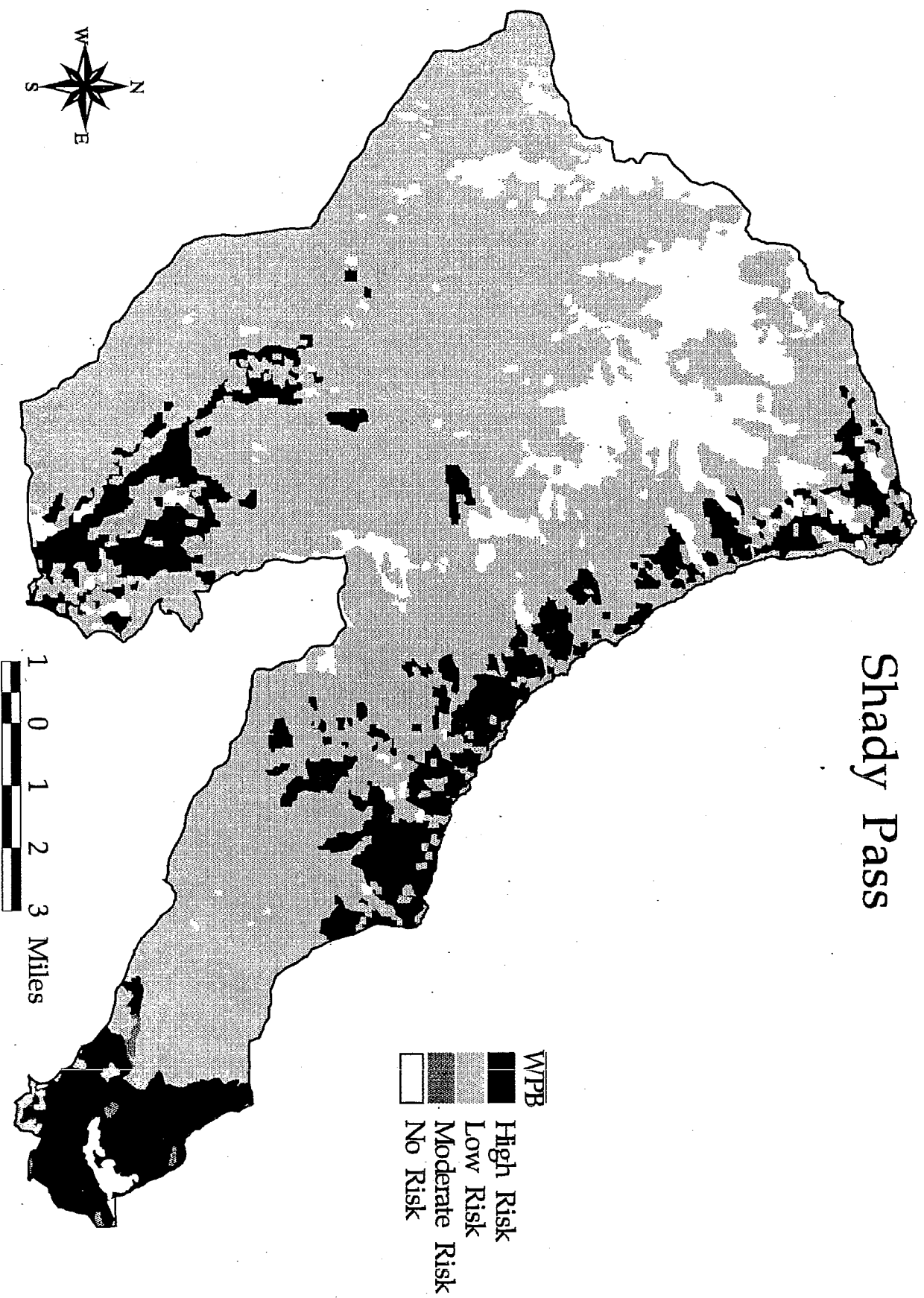




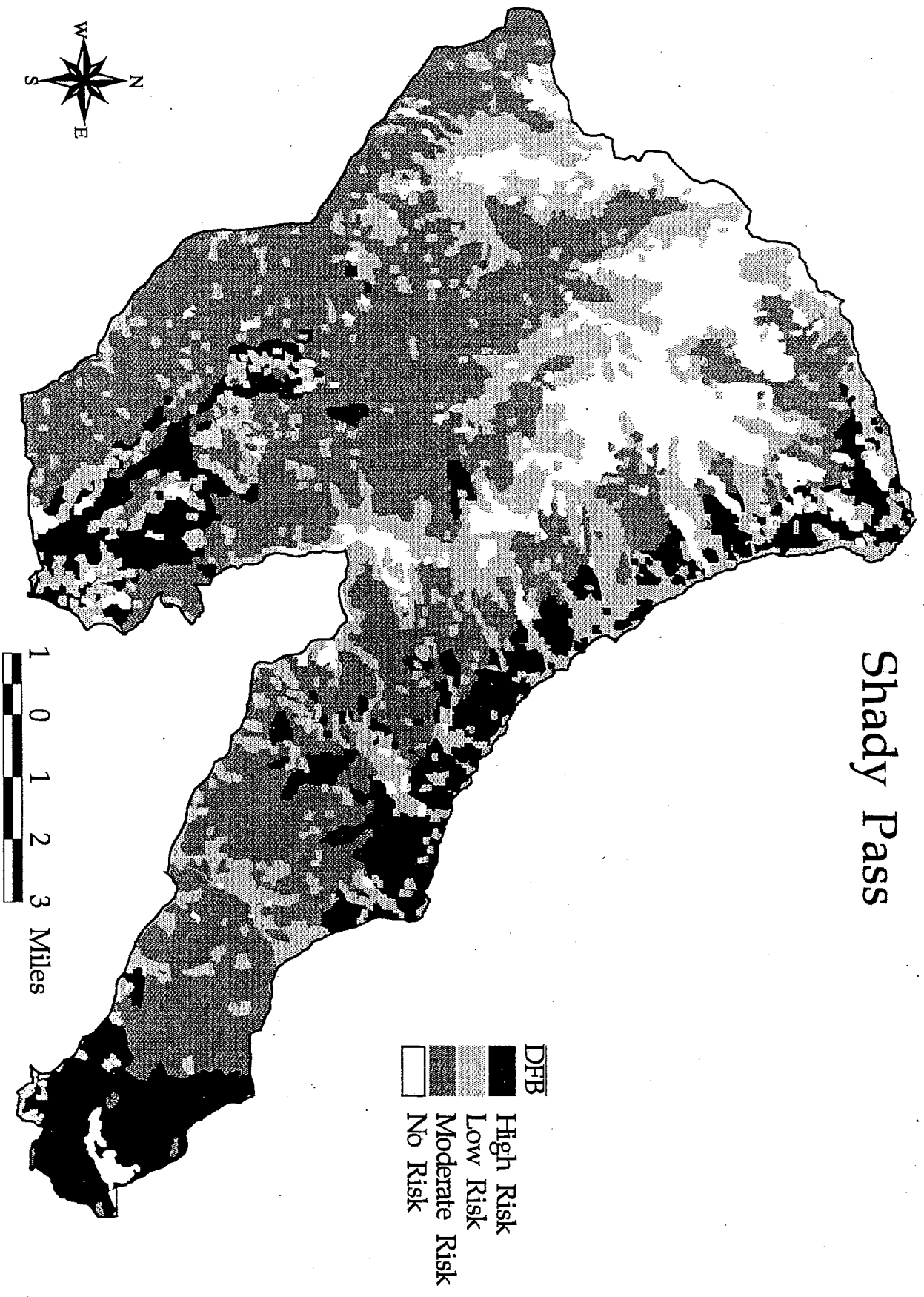
# Shady Pass



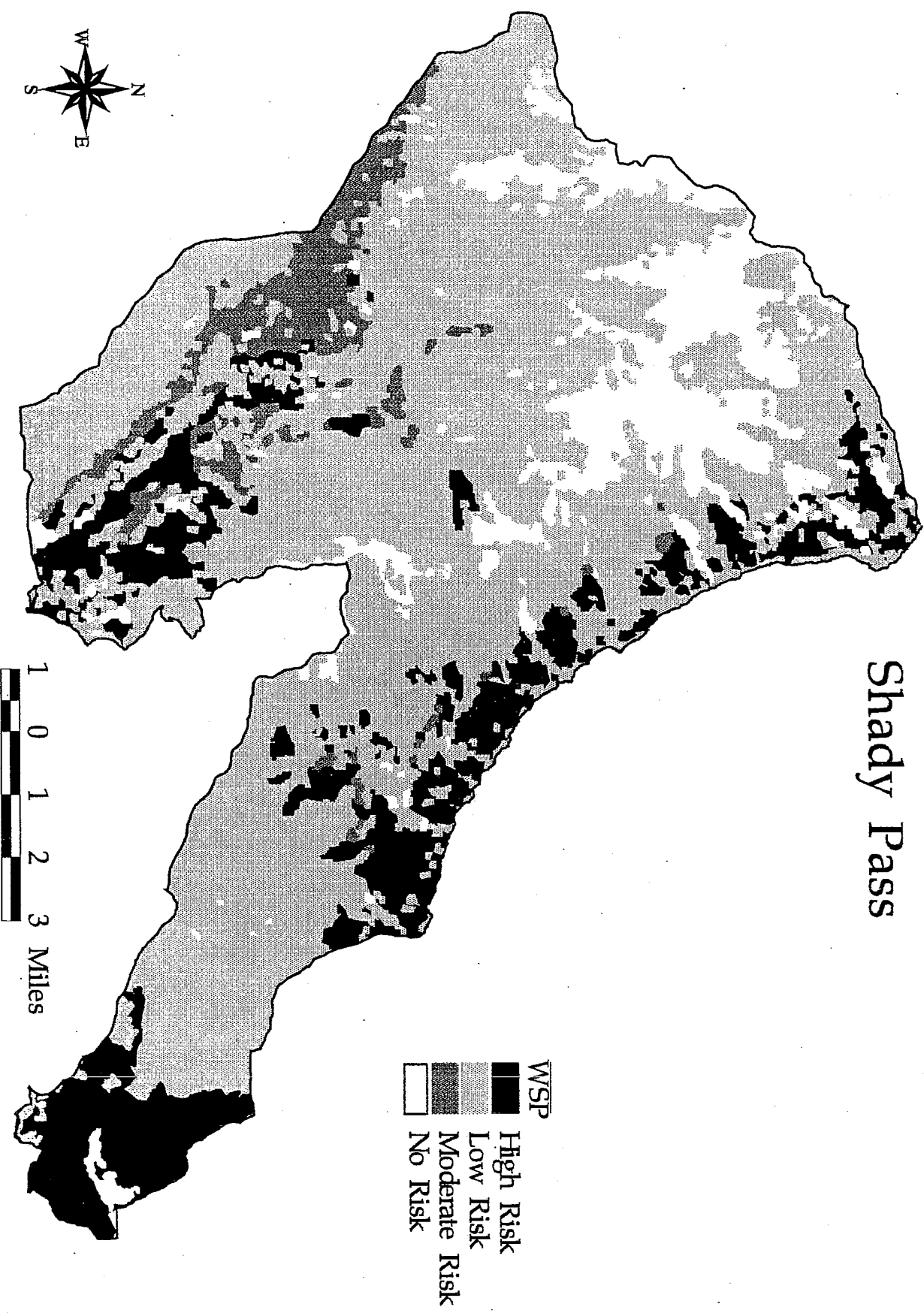
# Shady Pass



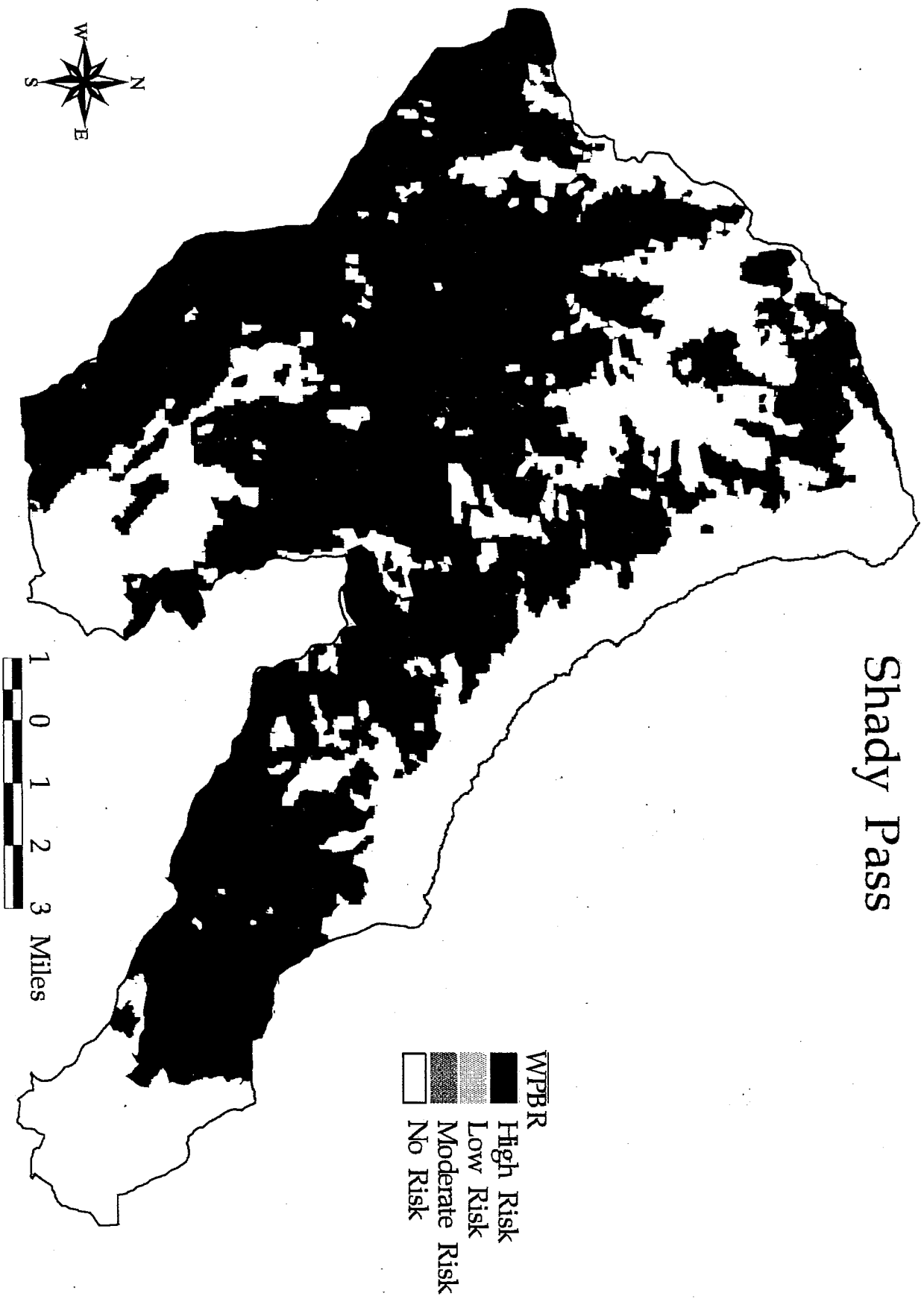
# Shady Pass



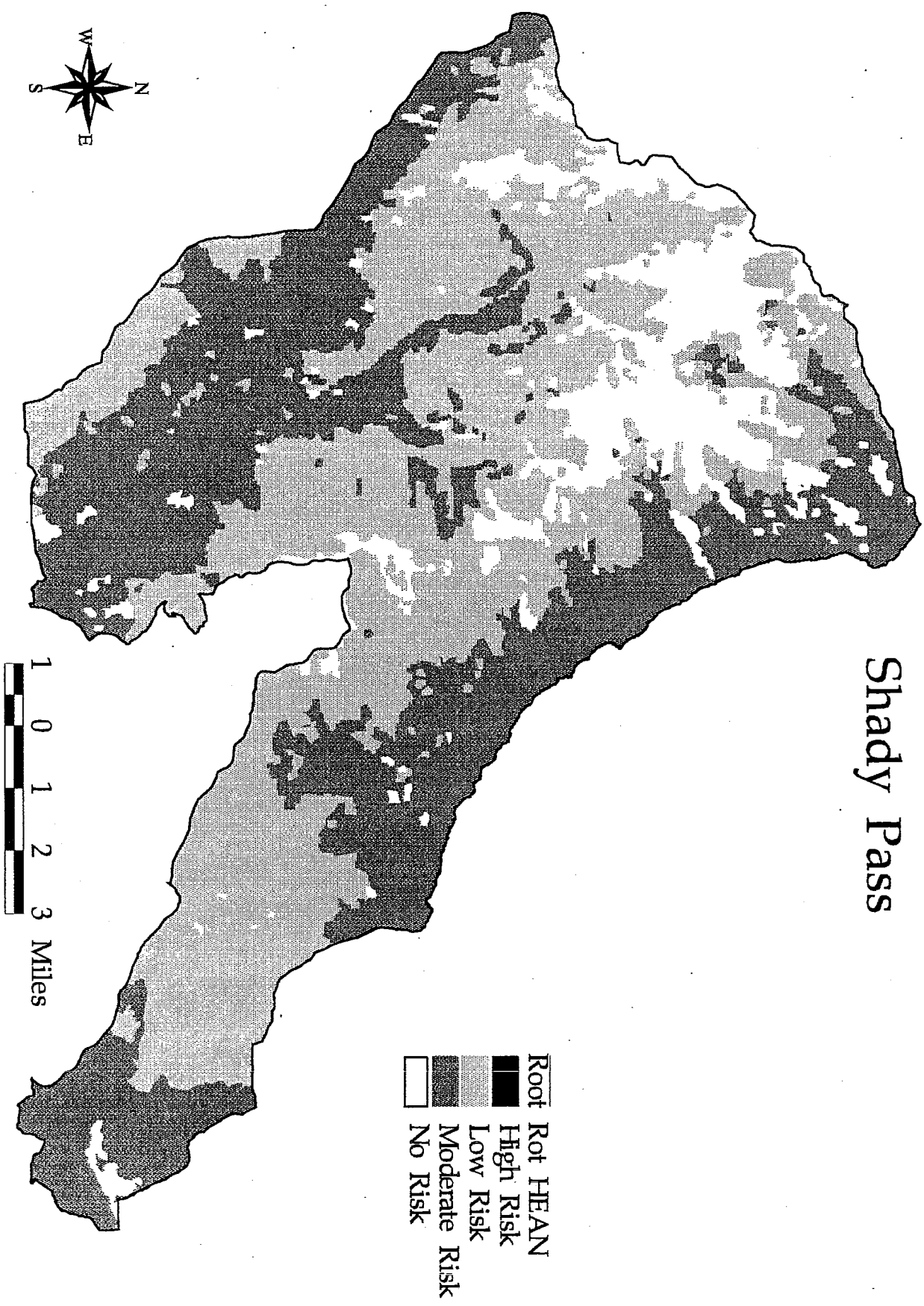
# Shady Pass



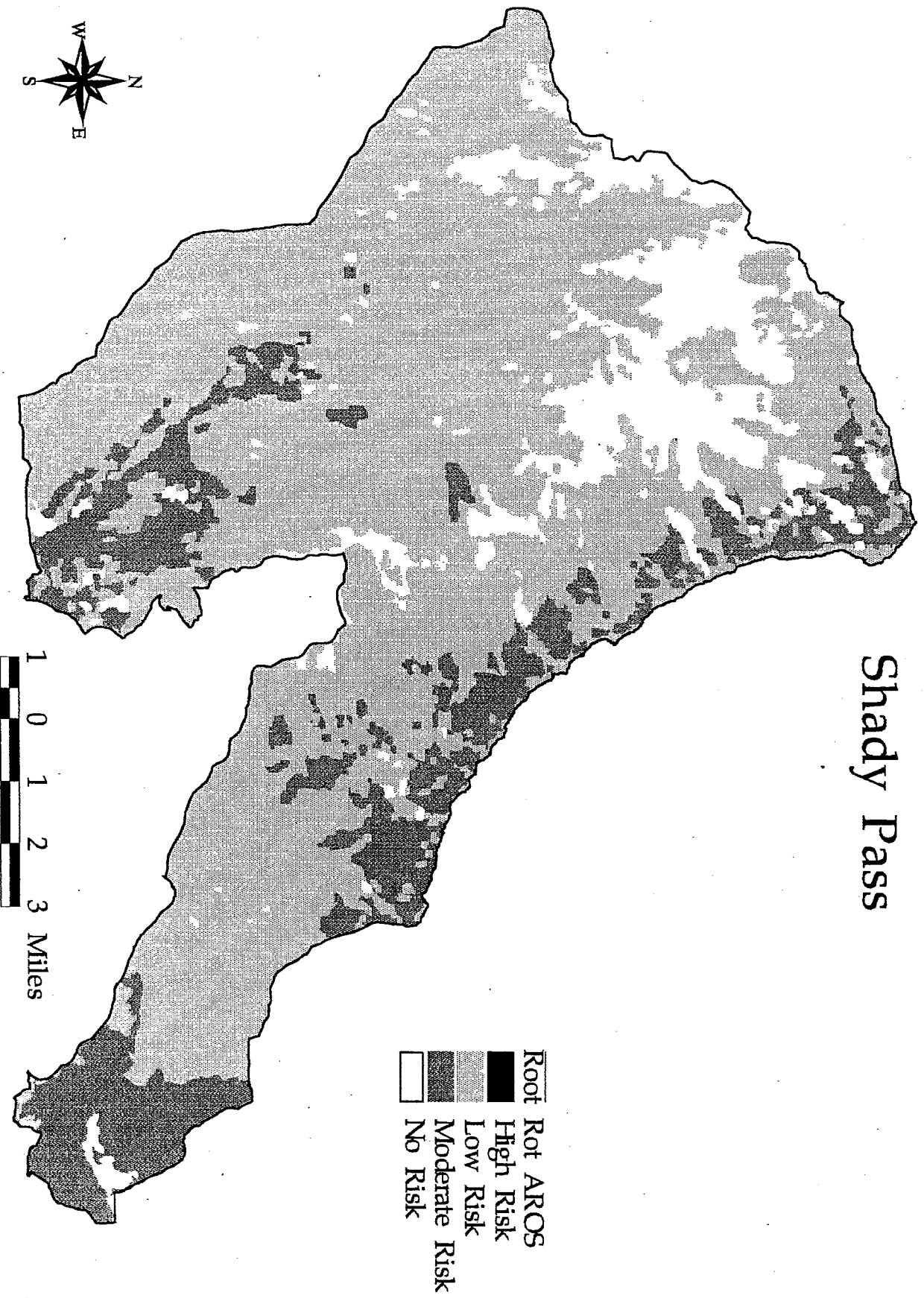
# Shady Pass



# Shady Pass

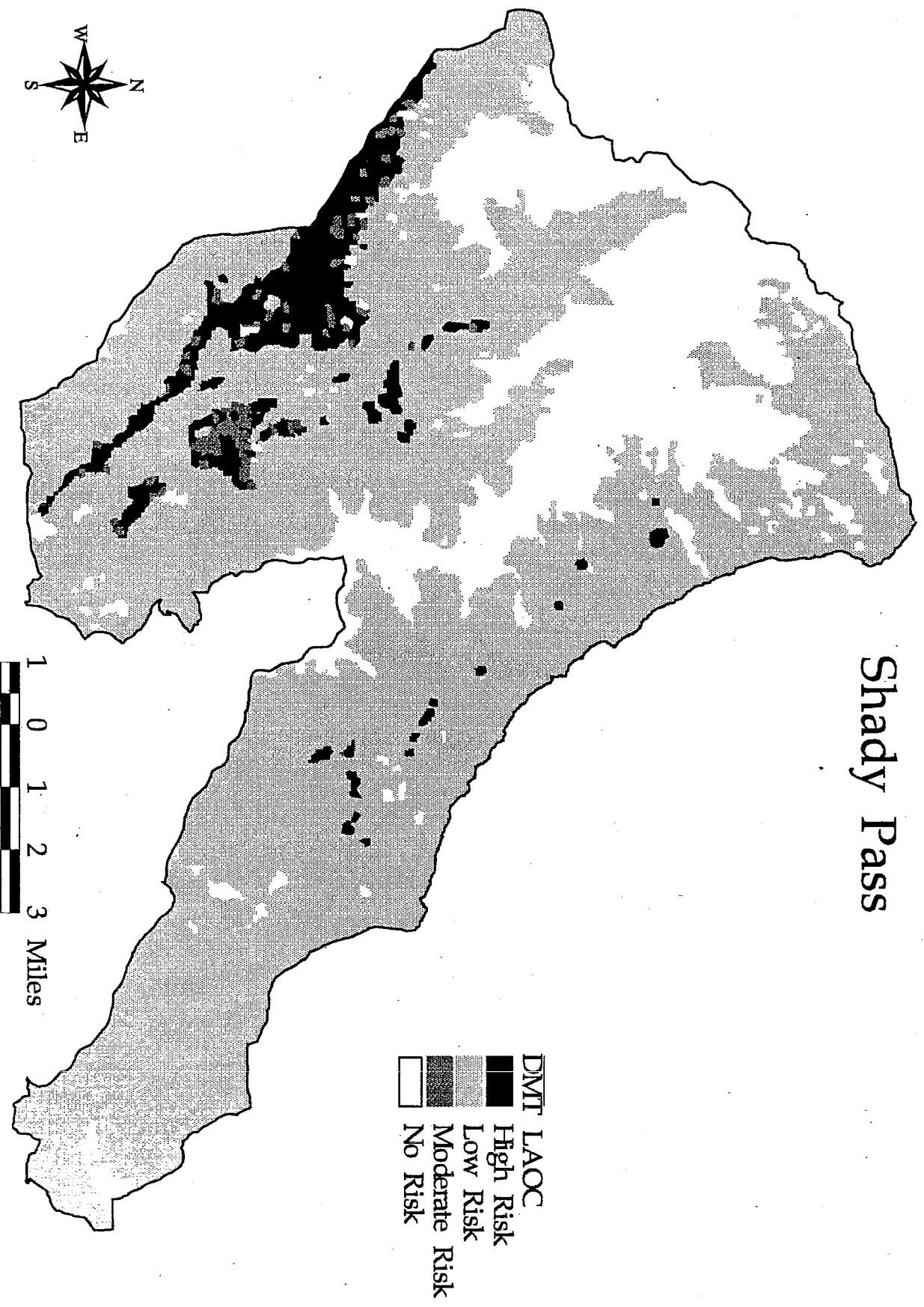


# Shady Pass



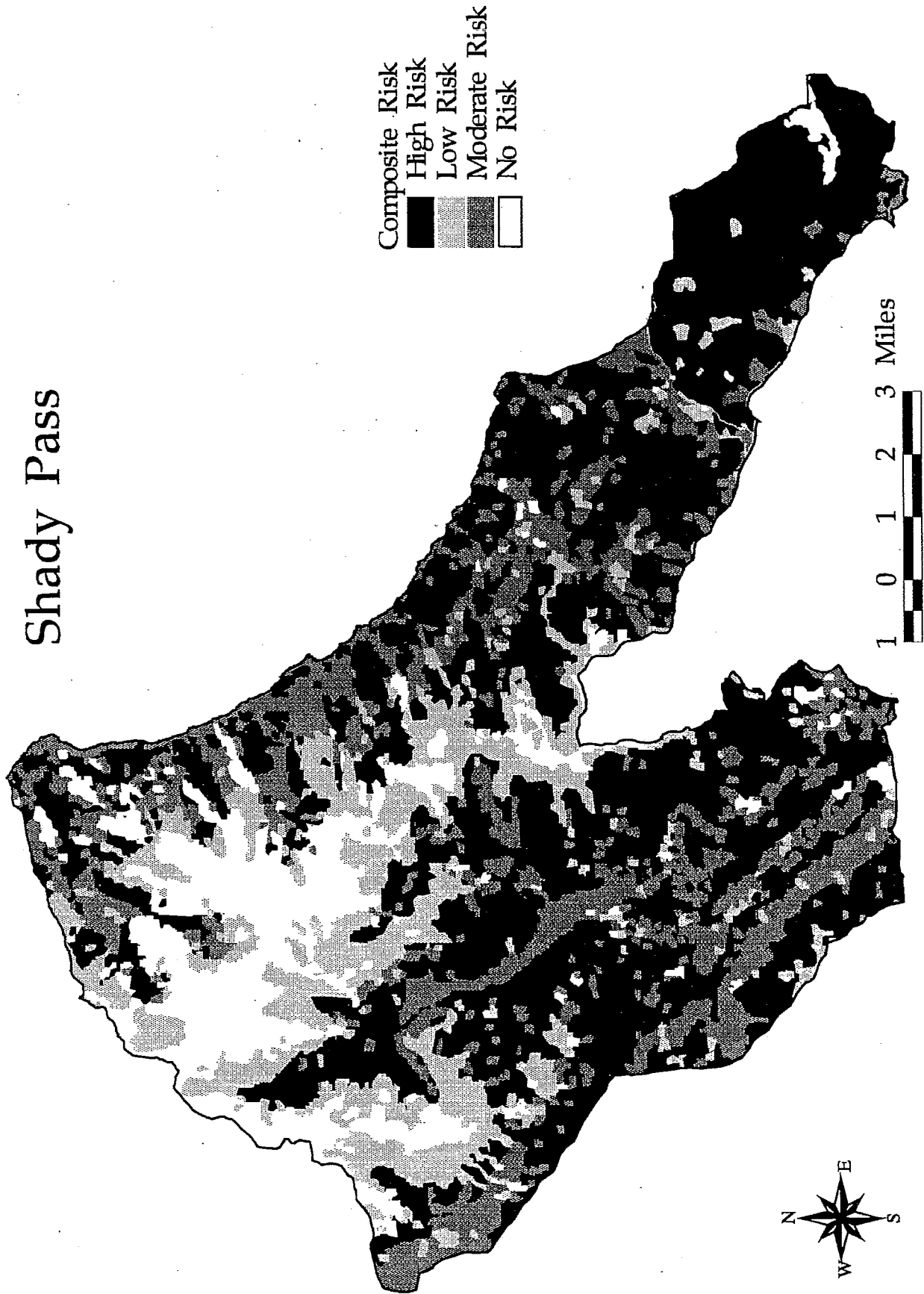


# Shady Pass

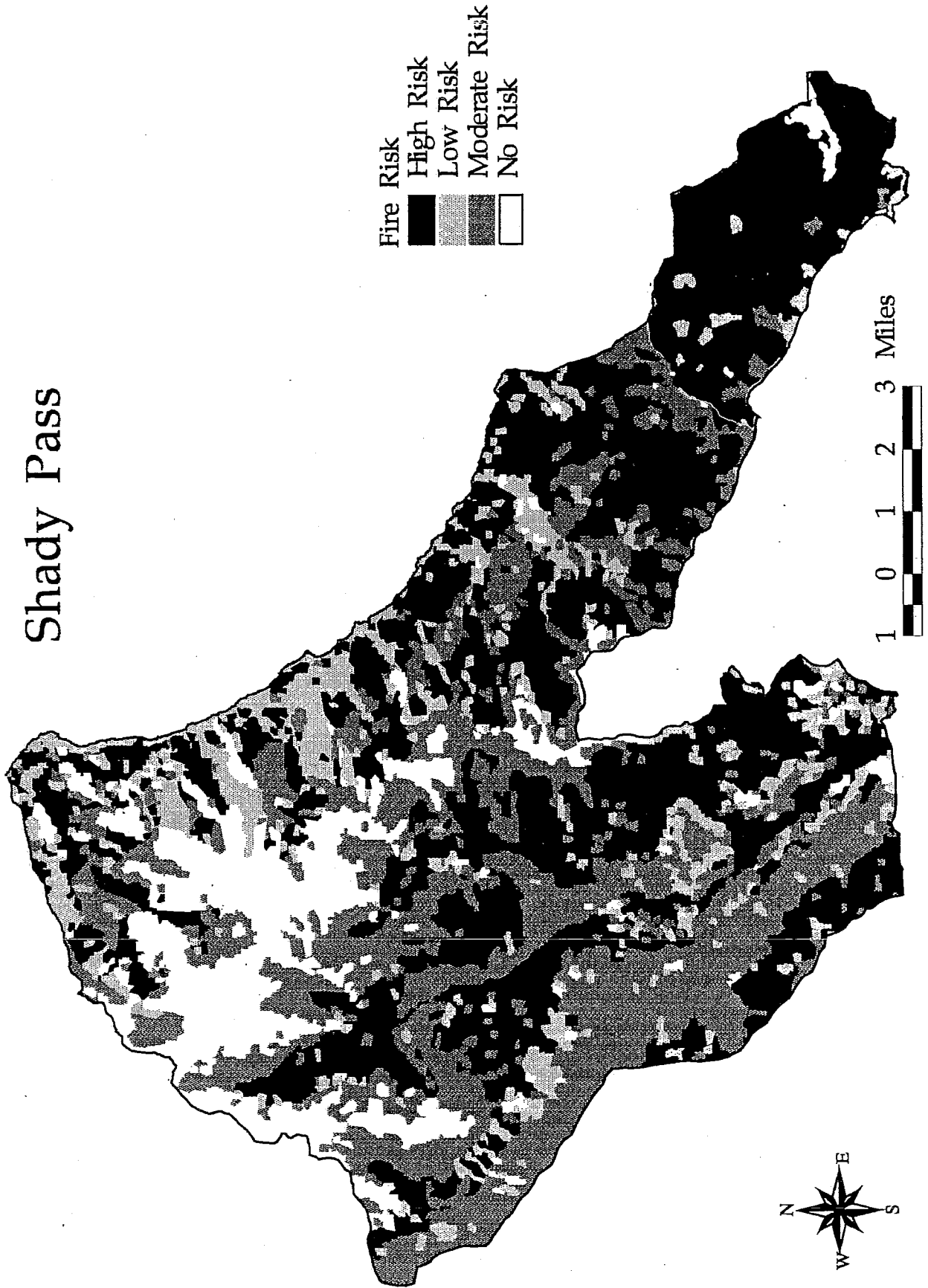




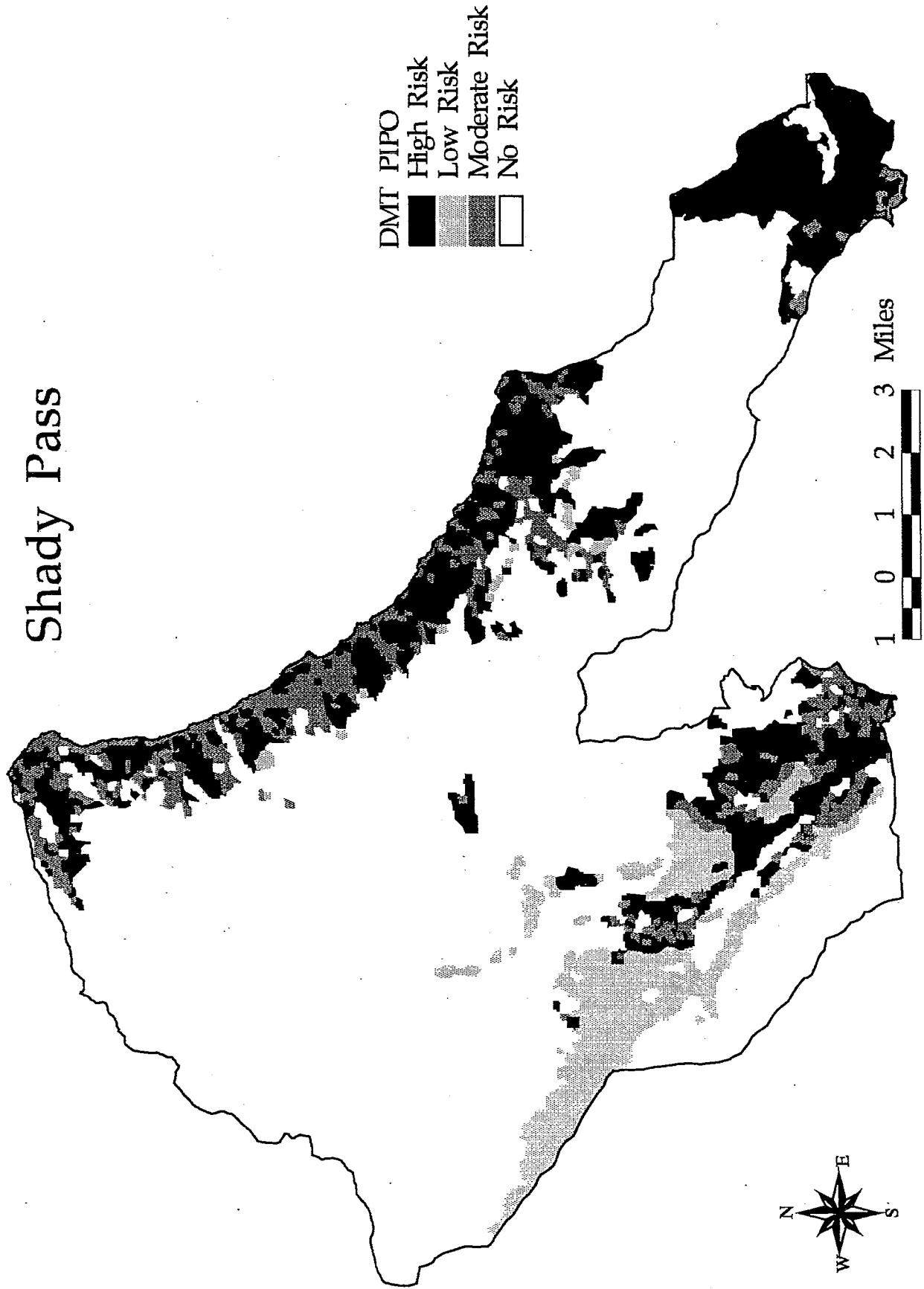
# Shady Pass



# Shady Pass



# Shady Pass



# Shady Pass

